TRADITION INVESTMENTS, LLC
15857 Bear Mountain Boulevard
Bakersfield, CA 93311

April 23, 2010

VIA Email to: Gluckman.Matthew@epa.gov
Hard copy by Certified Mail
Electronic Information Via. UPS Next Day Air

U.S. Environmental Protection Agency
Attention: Matt Gluckman
NPDES Programs Branch
Water Division, WN-16J
77 West Jackson Blvd.
Chicago, IL 60604

Re: Response to Supplemental Information Request Made Pursuant to Section 308 of the Clean Water Act; Traditions South Dairy, Nora, Illinois. Docket No. V-W-10-308-16

Dear Mr. Gluckman:

On behalf of Tradition Investments, LLC ("Tradition"), the following is provided in response to USEPA's Supplemental Information Request ("Requests") regarding the above-referenced site. These responses will be timely supplemented if additional responsive information is discovered.

PRELIMINARY STATEMENT AND GENERAL OBJECTIONS

Preliminary Statement

The following people were consulted in preparing answers to this information request:

Terry L. Feldmann, PE *
James L. Evans, PE *
Jason E. Olmstead, PE *
c/o Maurer-Stutz, Inc.
7615 North Harker Drive
Peoria, IL 61615
(309) 693-7615

Exemption (b)(6)

15857 Bear Mountain Blvd.
Bakersfield, CA 93311
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* Denotes NRCS certified technical services providers for CNMPs and other conservation practices.

General Objections

Tradition objects to the Requests to the extent that they seek information or documents protected by the attorney-client privilege or the attorney work-product doctrine or are otherwise privileged and confidential and qualify for an exemption from disclosure. Tradition further objects to the Requests to the extent they seek information from sites or locations other than the Dairy or are vague, ambiguous, overbroad or require conjecture or presume the discharge of pollutants to surface or groundwater. To the extent responses to the Requests require estimates, Tradition has made a good-faith estimate based on the information and scientific methodology available to it. The facility at issue is the Traditions South Dairy facility located at 12521 East Mahoney Road, Warren, Illinois. Tradition objects to the Requests to the extent they seek information that is not within Tradition's care, custody or control or involve a site or location other than the Tradition South Dairy site.

Tradition has made a reasonable effort to locate documents responsive to the Requests. Response items or documents have been labeled for each question requested (e.g., Q9 for supplemental information request question 9). Some of the information relating to the SPAW modeling is being supplied electronically only on a diskette as the number of pages is enormous.

Tradition makes these responses subject to, and without waiving, any and all rights, defenses or privileges applicable or potentially applicable thereto. Without waiver of any of the foregoing reserved rights, privileges or defenses, and subject to the general objections above, Tradition hereby responds as follows:

A. INFORMATION REQUEST

Manure and Wastewater Storage Capacity

1. Please provide the capacity (volume) and Expected volume of manure and process wastewater to be delivered to the following:

- **The two reception tanks associated with the manure transfer system**
- **The reception tank associated with the solid/liquid separation facilities**
- **The lift stations**
- **The digester**

Response:

The above mentioned components are part of the facilities manure transfer or treatment systems and are not accounted for or relied on for the storage of manure and process wastewater. The function of these systems is listed below:

- Lift stations P18 and P19 receive process wastewater from the foot baths located in the holding pen, P7. The combined capacity is 3140 cubic feet. These two tanks are planned to be connected to reception tank P28 with a gravity flow pvc pipe. Each footbath will typically contain 12 cubic feet. We estimate that P18 and P19 will hold the volume of 250 footbath emptying events.

- Reception tank P28 receives manure and process wastewater from the parlor and holding pen. The tank is designed with two pump systems, one that is used to "pump" flush the holding pen and a second to transfer manure and process wastewater to the west 24" diameter gravity flow flume pipe. In case of a power or pump failure the tank P28 has a 15" diameter emergency overflow pipe that connects to the west 24" diameter flume pipe. The volume of P28 is approximately 2880 cubic feet. The volume of waste received by P28 is approximately 36,000 gallon per day as shown in our AWM (Animal Waste Management) calculations (wastewater produced sheet) previously provided.

- Reception tank P27 receives manure and process wastewater from the barns through the two 24" diameter PVC flume pipes (east and west sides of the facility) and from reception tank P28. The tank is designed with two submersible pumps that will be used to pump flush the east and west 24" diameter flume pipes. A dry well located in the west end of the reception tank house four positive displacement pump system that will be used to pump all of the manure and process wastewater to the digester. In case of power or pump failure P28 has a 24" diameter PVC emergency overflow pipe that is designed to gravity flow to earthen holding pond P14. The volume of P28 is approximately 45,000 cubic feet. We estimate that P27 will receive approximately 16,924 cubic feet per day on average as shown on our AWM calculations (Facility Volumes sheet) as it receives essentially everything except the runoff volume.

- Reception tank P25 receives manure and process wastewater from the solid/liquid separation system which processes the digested effluent from P23. The tank is designed with a pump and PVC forcemain pipe system that transfers the effluent to holding pond P14. In case of power or pump failure the tank also has an 8" diameter emergency overflow pipe to transfer to earthen holding pond P14. The volume of P25 is approximately 9128 cubic feet. We estimate that P25 will receive approximately 16,142 cubic feet per day on average as shown on our AWM calculations (Facility Volumes sheet) as it receives essentially everything except the runoff volume and bedding/solids removed volumes.

- See additional plans included with this response for P23, concrete methane Digester. Digester P23 receives manure and process wastewater from reception tank P27 that we estimate to be 16,924 cubic feet per day. The digester is designed with a submersible pump and PVC forcemain system that will be used to transfer effluent from the digester to the solid/liquid separation system in P25. In case of power or pump failure the tank also has an 8" diameter PVC emergency gravity flow pipe designed to transfer effluent by to earthen holding pond P14.

2. **Please clarify whether and how the runoff volume for the 25-year, 24-hour storm is accounted for in the animal waste management (AWM) model results for holding pond 3 (P17).**

   Response:
   The calculated runoff volume for the 25-year, 24-hour storm can be found on the bottom half of the runoff calculations sheet of the AWM (113,647 cubic feet). This runoff volume can also be found on the bottom of the Holding Pond 3 design sheet, P17 page of the AWM.

3. **Please clarify the existence and function of the "Covered Stack Pad 2, P5." If used for storage of manure, verify that no runoff or leachate is expected from the area or specify how runoff and/or leachate will be managed.**

   Response:
   The waste storage area "Covered Stack Pad 2, P5" is the bedpack area located inside of barn P5. The bedpack area is under roof, protected from precipitation and storm events. Any leachate from the bedpack area will be collected with the scrape alleys within the barn and transferred to the 24" diameter PVC, gravity flow flume pipe system.

4. **Please clarify the amount of wastewater and manure that will be generated and the ultimate use or disposal for each. If the annual volume or mass planned for use or disposal is less than the anticipated volume or mass generated, explain the storage and management planned for the manure and wastewater not used or disposed of.**

   Response:
   The amount of wastewater and manure generated equals the amount to be used or sold. Most of the volume or mass generated will be land applied. A portion of the separated solids will be sold for bedding or otherwise transferred offsite. The solids/bedding to be sold or otherwise transferred offsite is estimated to be 3300 Tons/year. A relatively small amount is destroyed by digester P23 to produce methane. We estimate that about 240,000 cubic feet of volatile solids per year are destroyed in the digester. The manure and process wastewater generated to be land applied to application fields are as follows:
   - Liquid: 54 million gallons/year

- Solid: 1100 tons/year

The following nutrients are estimated to be transferred offsite annually with the sale of bedding/solids: 24,000 lb of nitrogen, 41,000 lbs of P2O5 and 17,000 lb of K20.

The manure and process wastewater nutrients generated to be land applied to application fields after storage and application losses are as follows:

- Liquid:
  - Total N = 957,000 lb/yr
  - Total P2O5 = 700,000 lb/yr
  - Total K2O = 875,000 lb/yr
- Solid:
  - Total N = 11,000 lb/yr
  - Total P2O5 = 3300 lb/yr
  - Total K2O = 6600 lb/yr

Soil Plant Air Water (SPAW) Pond Hydrology

5. **Please provide an electronic version of the SPA W Annual Budget output report for the pond hydrology model scenarios provided in the August 2009 Response.**

   Response:
   Electronic files for the annual and daily output reports can be found on the CD, and called TSD Ponds Annual Out and TSD Ponds Out. The daily output file, TSD Ponds Out is several hundred pages.

   Also included on the CD, is the project Folder TSD Ponds. If loaded in the SPAW database and if the "Concrete Silage Pad" field project is also loaded in the SPAW database, the pond model can be opened and a simulation performed (if necessary) and any report can then be viewed. For the purposes of checking the SPAW model inputs on the pond model, paper printed "screen shots" populated for TSD Ponds model are attached with this response.

6. **Please provide an electronic version of the SPAW Input Data File report for the pond hydrology model scenarios provided in the August 2009 Response. Describe how the pond depth-area inputs are used to accurately reflect the cumulative capacity of the three holding ponds.**

   Response:
   Electronic files for TSD Ponds model are included on the above referenced CD.

   The depth-area table populated in the TSD Ponds model reflects the total surface area of the three ponds at any given elevation/stage. Planned bottom elevations of the three ponds are different. An area was included for the elevation that represented the lowest point for each pond. The emergency spillway elevation for all three ponds is 990.8.

The lowest elevation in the lowest pond is 970.0. Cross over pipes are at elevation 988.3 and connect P14 to both P17 and P16. The top of berm is not lower than 991.3 for all ponds.

The attached Table, Stage vs Storage for TSD Ponds P 16, 17 and 14, shows the lowest elevation of each pond, area for each pond at each elevation and total area at each elevation.

Ponds P16 and P17 can fill at the same time. Pond P14 is for primary settling of solids, and may be full to the cross over pipes most of the time. The most conservative scenario for pond storage would be to exclude P14 from volumes available for storage. TSD Ponds was re-simulated with the depth area table changed to eliminate area(s) in P14. That scenario is included in the CD as the project TSD Ponds w/o P14. Also, attached, is a graph of pond elevations for the years 1980 to 1999. This graph corresponds to one page of the output provided in the 2009 response. Note that the difference in maximum pond elevations is not significantly changed from TSD Ponds – both maximums appear to be about elevation 987, or 3.8 feet below the spillways.

Land Application

7. **The planned frequency for emptying or dewatering of manure and process wastewater containment, storage and treatment structures is unclear based on a comparison of the information provided in Tradition South's August 2009 response, the NMP, and the Operation and Maintenance Plan. Please clarify the planned frequency tor emptying or dewatering the holding ponds.**

   Response:
   Liquid effluent applications from containments P14, P16, and P17 are planned to be emptied at least once every 12 months. Most liquid applications are planned for September through November. However, applications during other months of the year will be allowed if soil and weather conditions are appropriate.

   Solid manure applications are planned at least once every 6 months. Most solid manure applications will occur in the fall and spring. However applications will occur at other time of the year if weather and soil conditions are appropriate.

8. **Please provide location data for each planned land application site (i.e. latitude and longitude for the comers of each field).**

   Response:
   The soil survey maps for each field show the locations (i.e. latitude and longitude). While many of the maps were provided previously, all of the fields can be found on the attached CD.

9. **Please clarify the following with respect to any silage leachate that was applied by Traditions South:**
   - **Dates of application (including year)**
   - **Weather conditions and soil conditions (i.e., saturated, snow-covered or frozen) for the dates of land application**
   - **Field(s) used tor land application**
   - **Crop(s) grown in the fields used tor land application**
   - **Nutrient content of the material that was applied.**

   Response:
   See attached page showing the above information for applications of leachate and runoff applied. The source and nutrient content is assumed to be about the same for all of the material applied. The nutrient content is as follows: Ammonia N = 97.6 ppm, Phosphate = 160 mg/l, Potassium = 275 mg/l.

SPAW Field Hydrology

10. **Please provide information on the physical characteristics entered tor the modeled soil types (Osco, Muscatine. Sable) utilized in the August 2009 Response. For each soil layer provide depth; percent sand, clay, organic matter. gravel; bulk density; and hydrologic group.**

    Response:
    Included in the CD, in the Soils folder, are data files for each soil used in the field projects in the initial SPAW Hydrology modeling, as well as for two additional soils (Greenbush and Rozetta) which were modeled for this response. Also, find attached screen shots of the soil data screens for each soil modeled which contain the requested characteristics. Also attached find a file for "Building Roof" which is an example file contained in SPAW and which was used to simulate an impermeable surface – concrete silage pad.

11. **Please clarify whether and how the three modeled soils utilized in the August 2009 response adequately represent the range of soil types that exist in the planned land application areas, particularly for those fields that are not dominated by one of the three modeled soils.**

    Response:
    Subsequent to EPA's request for additional information, a more extensive evaluation of soils in fields owned or controlled by Tradition Family Farms was conducted. See the attached Table Tradition Dairy – Soils. This table lists all soils found on the 18 tracts (40 fields) owned or controlled by Tradition Family Farms.

    Note that Osco and Muscatine acreages are > 60% of all the acres in the 18 tracts. Osco and Muscatine are also the dominant soils on 11 of the tracts. However, since Greenbush and Rozetta are dominant on 6 tracts, they were also modeled for this response. The only tract not dominated by one of these 4 soils is a 6.7 acre tract (1

field) that is 40% Dubuque soil type, which is a Hydrologic Group B soil and very similar to the other 4 silt loam soils modeled.

The 4 soils modeled for this response (Osco, Muscatine, Greenbush and Rozetta) comprise > 75% of the acreage in the 18 tracts owned or controlled by Tradition Dairy.

12. **Please provide model results for planned crop rotations, or describe whether and how the modeled crops or rotations utilized in the August 2009 response are representative of the actual planned rotations.**

Response:
The nutrient management plan for Tradition South Dairy proposes to utilize effluent from ponds in the fall, on acres that will be planted to corn, or on pasture/hayland. Corn ground will either be in a corn – corn rotation or a corn – soybean rotation. The model results submitted are for application in October or May. Because there may be occasions when the producer will choose to utilize effluent on soybeans, application was modeled on corn, soybeans and pasture/hayland.

The initial comparison between a no irrigation condition and the application of 0.67 inches of effluent in the fall were made for Osco soils and for corn, soybeans and pasture/hayland. Though only slightly greater, the increase in runoff (average annual) was greatest (0.06 inch for corn vs. 0.05 inch for soybeans) for application on corn. Initial modeling on other soil types was only for fall application on corn.

13. **Please provide model results tor corn silage, or describe whether and how the modeled corn crop utilized in the August 2009 response is representative of rotations that include corn silage.**

Response:
The original SPAW database does not provide a specific file for corn silage. Crop growth and canopy for both silage and corn grain are the same. Both are row crops and fields in corn, with minimum tillage would be considered in good hydrologic condition, so the runoff curve number generated by SPAW would be the same. The data set used for corn was "Example Corn – Corn Belt", and is contained in the "Crops" folder in the CD.

14. **Please provide model results showing the expected runoff and infiltration for the maximum planned application rates tor each field to be used for land application.**

Response:
Attached find Summary(s) of Annual Values for Osco soil type with corn, soybeans and pasture and for 0.67 inches of irrigation in one day in October to November or in May. The other three soils are only modeled for corn, but do include both fall and spring application scenarios.

Also attached find the table "Tradition South Dairy – SPAW Field Results".

The application of 0.67 inches of effluent in one day is equivalent to approximately 18,000 gallons per acre. This rate exceeds any recommended rate in the nutrient management plan for Tradition South Dairy. A more usual rate would be less than 9,000 gallons per day, or 0.33 inches of effluent.

The original hydrology (Fields) has been modified to specify application on days when no rainfall occurs, as per Best Management Practice recommendations.

The table "Tradition South Dairy – SPAW Field Results" shows that the maximum increase in average annual runoff from the application of 0.33 inches of effluent, in the fall, on corn is 0.04 inches. The maximum increase in average annual runoff would be from application of 0.67 inches of effluent to soybeans in the spring, and is 0.11 inches. However, the application of effluent to soybeans in the spring, at that rate, is not recommended in the nutrient management plan.

Application of effluent by injection (drag hose or tanker) would preclude runoff of effluent.

The CD includes Project files (Fields) for all crops and soils and irrigation dates and rates shown in the table "Tradition South Dairy – SPAW Field Results". Those project files can be opened in SPAW and reports can be viewed/printed.

Hydrologic Connection

15. **For at least one borehole location within the footprint of each of the two larger holding ponds (P16 and PI7), please provide data on the thickness of the natural clay liner in the overburden, and whether the underlying bedrock is shale or fractured limestone.**

    Response:
    See previously submitted documents including boring logs and Construction Plans Sheet C3 "Grading Plan" for boring locations. Borings S10 and S13 are located within holding pond P14. Borings S14, S15 and S16 are located within holding pond P16. Borings S9 and S18 are located within holding Pond P17. Additionally, the following borings are located near the exterior of the holding ponds S7, S8, S11, S12, S17, S17A and S17B (note 17, 17A and 17B were performed at essentially the same location). The bedrock found at the Tradition South facility is a dolomite limestone.

16. **For each of the Holding Ponds (PI4, P16, PI7), please provide Soil Water Characteristic Curves for the liner and native clay materials based on grain size, density, moisture content of the materials. Please also provide hydraulic conductivity (saturated and unsaturated) and porosity estimates for the liner and native clay materials.**

    Response:

Please refer to the boring logs with tests previously submitted including USCS visual classifications, unconfined compressive strength, SPT-N blows per foot, water content (moisture), dry unit weight (density), atterberg limits (liquid and plastic limit, plasticity index). Borings S10 and S13 are located within holding pond P14. Borings S14, S15 and S16 are located within holding pond P16. Borings S9 and S18 are located within holding Pond P17. Additionally, the following borings are located near the exterior of the holding ponds S7, S8, S11, S12, S17, S17A and S17B (note 17, 17A and 17B were performed at essentially the same location). Also see the following additional data attached to this response: Standard Proctor Moisture-Density Curves with Atterberg Limits and Constant Head Permeability Tests for remolded bulk soil samples and (Terracon report numbers 07075126.0001, 07075126.0002); Triaxial Shear Test reports by Terracon's H. C. Nutting Company which includes atterberg limits, water content, dry density, saturation and void ratio; Terracon report 07082013.0002 showing moisture-density Standard Proctor curve and Coefficient of Permeability on a remolded sample; Terracon report 07082013.0009 showing coefficient of permeability on three different in-situ soil samples via. thin walled Shelby tubes; Terracon report 07082013.0011 shows Atterberg limits for soil samples from P17, Terracon report 07082013.00063 shows Atterberg limits and a Moisture-Densisty Standard Proctor Curve for soils used for compacting the clay liner in holding pond P14; Terracon report 07082013.00065 shows a Moisture-Densisty Standard Proctor Curve for soils used for compacting the clay liner in holding pond P14; Terracon report 07082013.00072 shows Atterberg limits and a Moisture-Densisty Standard Proctor Curve for soils used for compacting the clay liner in holding pond P14; Terracon report 07082013.00078 shows Atterberg limits and a Moisture-Densisty Standard Proctor Curve for soils used for compacting the clay liner in holding pond P14; Terracon report 07082013.00079 shows Atterberg limits and a Moisture-Densisty Standard Proctor Curve for soils used for compacting the clay liner in holding pond P14; Whitney & Associates reported tests for Atterberg limits, standard proctor, grain size distribution and remolded permeability test on clay liner candidate material from the bottom of holding pond P17, three permeability tests taken on the compacted clay liner of holding pond P14 with thin walled Shelby tubes. We have no porosity tests and do not understand what is intended by your question on porosity estimates. We believe that for the intent of your question that hydraulic conductivity tests are essentially the same as the coefficient of permeability tests that we have provided.

17. **Please clarify the operation and maintenance procedures that will be used to prevent leakage from all wastewater containment. Storage, and treatment structures, including holding ponds, reception tanks, lift stations, and the digester.**

Response:
See "IL DNR-OWR Operation and Maintenance Plan" previously provided. This plan will be followed for all of the holding ponds including the clay liner on the interior slopes and the pond bottoms. The "Tradition South Dairy Operation and Management Plan" previously provided will also be followed for details list of maintenance and inspection procedures. All containments, treatment and storage structures will be maintained to

prevent leakage. Weekly inspections are to be provided. Each of the holding ponds have six (6) ramps with pads to be used during pumping and agitation to protect the compacted clay liner (see construction plans previously provided). Please see revised Tradition South Dairy Operation and Management Plan.

18. **Please identify any land application site to be used by Traditions South that is known to include karst topography. For each such site, please model the field hydrology to estimate deep drainage responses for actual soil types and planned crops and application rates tor the site.**

Response:
There is no known karst topography within the land application areas planned to be used by Traditions South.

I certify under the penalty of law that I have examined and am familiar with the information submitted in responding to this information request for production of documents. Based on my review of all relevant documents and inquiring of those individuals immediately responsible for providing all relevant information and documents, I believe that the information submitted is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Date: 4·23·10

Exemption (b)(6)

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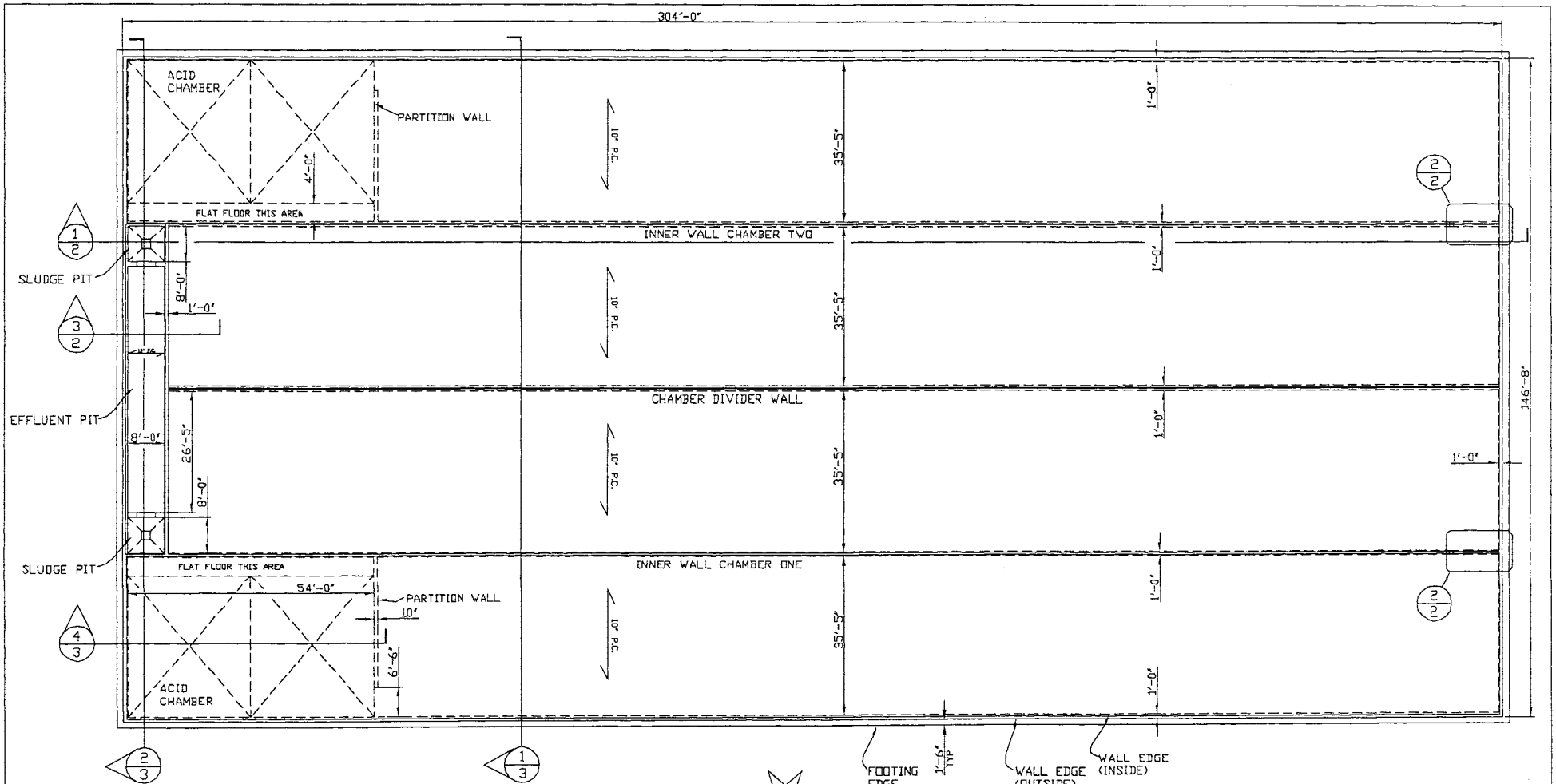
Exemption (b)(6)

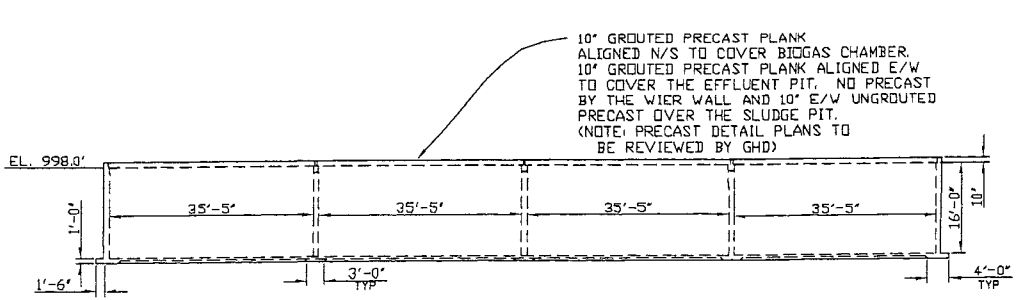
Printed Name of Member Manager

cc: Exemption (b)(6), Tradition Investments, LLC
Terry L. Feldmann, Maurer-Stutz, Inc.
Bruce Yurdin, IL EPA
Donald Manning, McGreevy Williams



PLAN VIEW

NORTH HALF MIRRORS SOUTH HALF

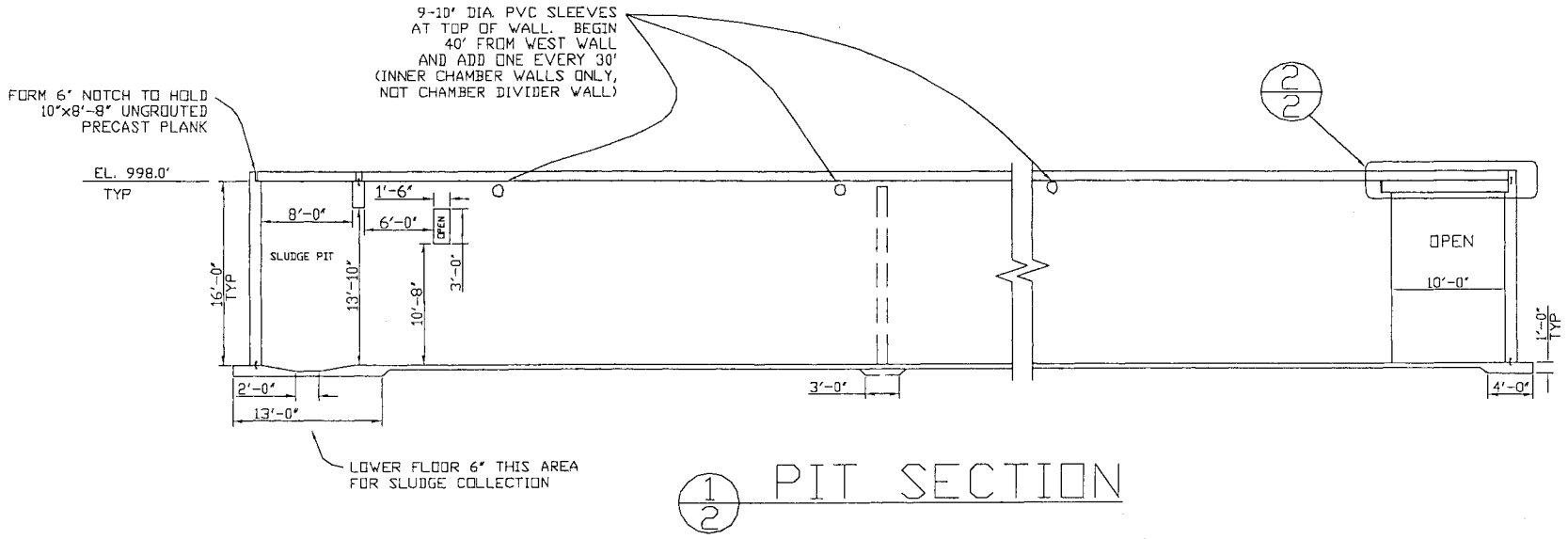


ELEVATION LOOKING EAST

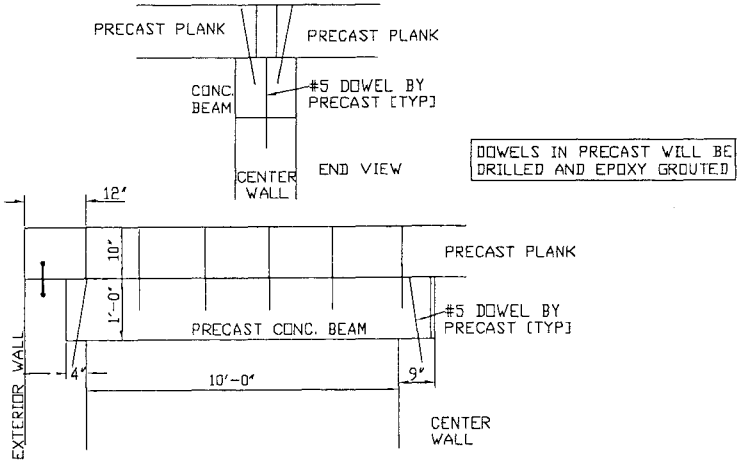
CONCRETE DIGESTER

Title: TRADITION SOUTH DAIRY			
Company: GHD, Inc.		Drawn By: DgDimensions	
		Scale: FIT	Date: 1/13/09
Location: Chilton, WI		Approved By:	Page: 1

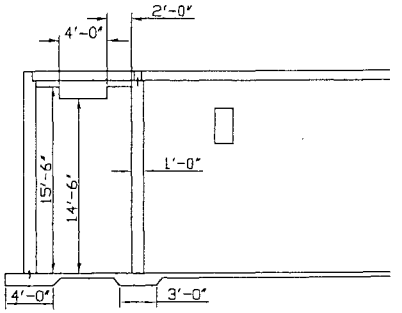
Q1



1/2 PIT SECTION

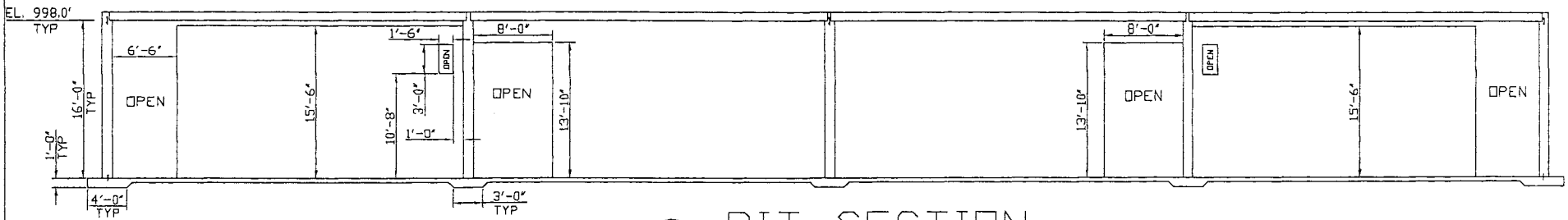


2/2 CONCRETE BEAM DETAILS (NO SCALE)

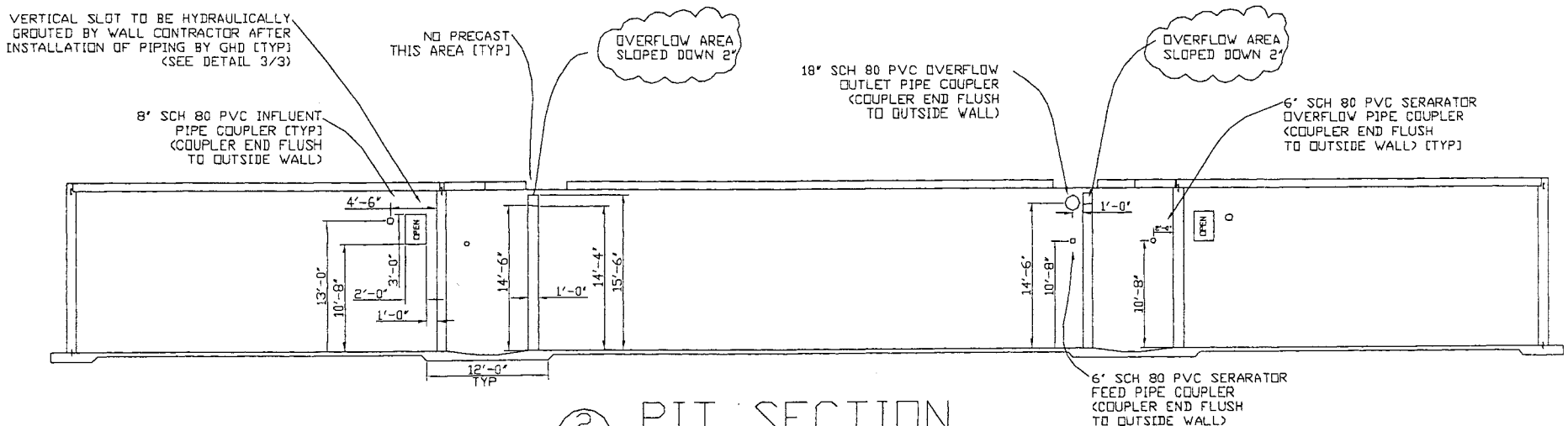


3/2 PIT SECTION

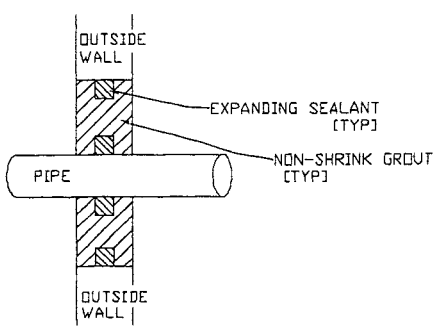
Title: TRADITION SOUTH DAIRY			
Company: GHD, Inc.		Drawn By: DgDimensions	
		Scale: FIT	Date: 1/13/09
Location: Chilton, WI		Approved By:	Page: 2



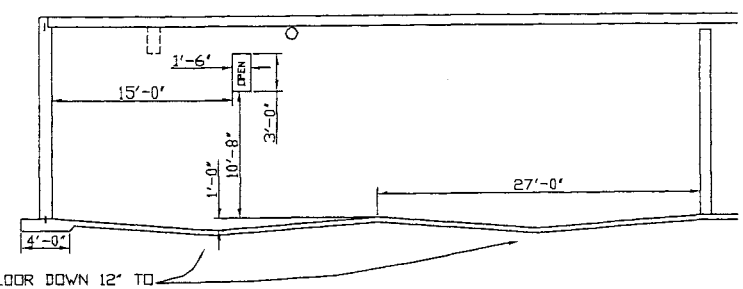
1/3 PIT SECTION



2/3 PIT SECTION



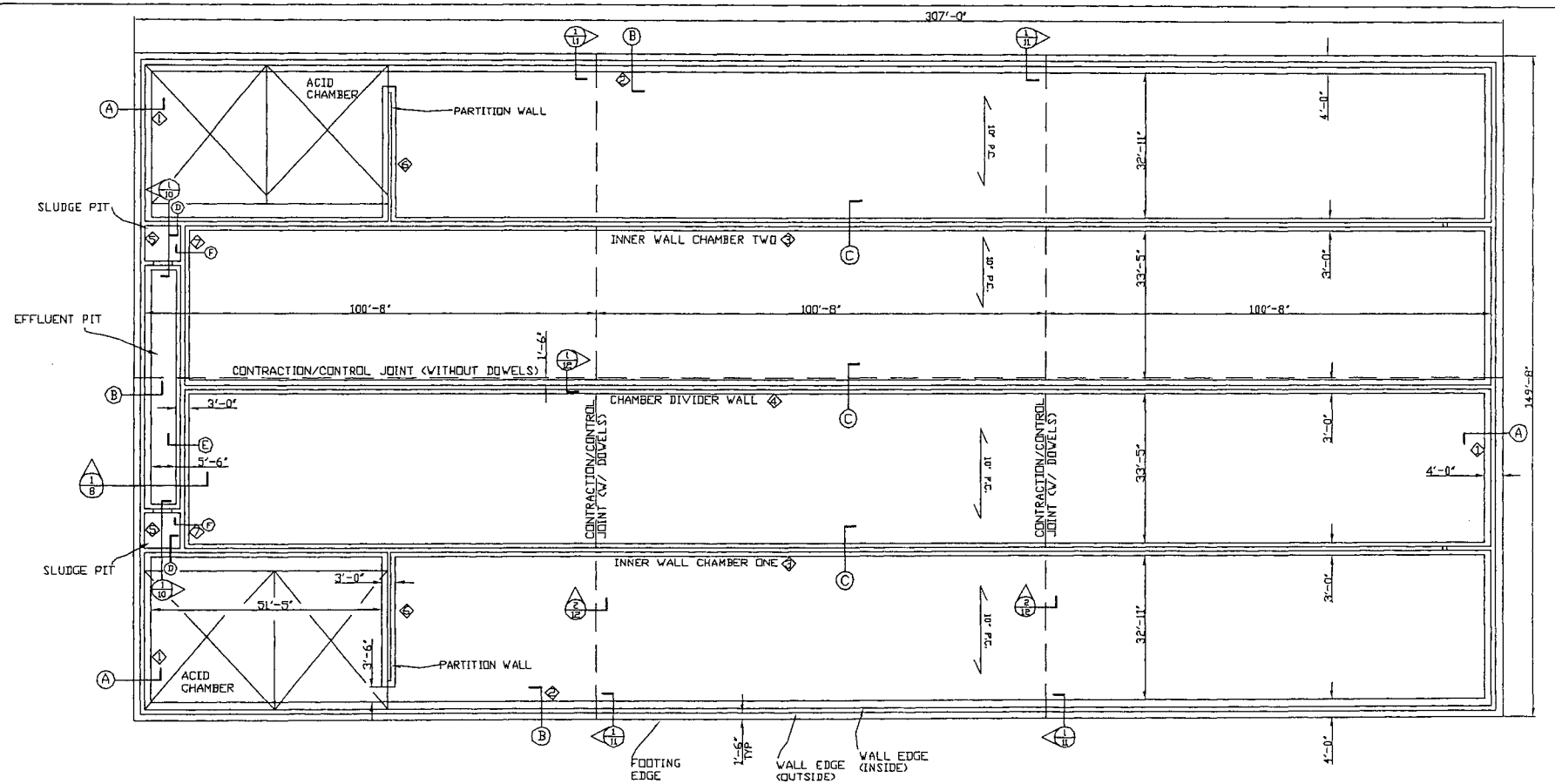
3/3 PIPE PENETRATION DETAIL (NO SCALE)



SLOPE FLOOR DOWN 12" TO TWO CENTER POINTS FOR HEAVY SEDIMENT REMOVAL (OFFSET 4', SEE PG. 1)

4/3 PIT SECTION

Title: TRADITION SOUTH DAIRY			
Company: GHD, Inc.	Drawn By: DgDimensions		
	Scale: FIT	Date: 1/13/09	
Location: Chilton, WI	Approved By:	Page: 3	



FOUNDATION PLAN

NOTE: R/F IN WALLS 1 & 2 SIMILAR, CONNECTIONS DIFFER

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STRUCTURAL NOTES

A. MATERIAL STRENGTHS
1. POURED-IN-PLACE CONCRETE, F'c.....4000 PSI @ 28 DAYS, TYPE 2 -CONCRETE TEST DATA COPIED TO GHD.
2. GROUT FOR P.C. PLANKS KEYED JOINTS TO BE 5000 PSI GROUT, FULL LENGTH OF PLANK.
3. REINFORCING STEEL.....ASTM A615, GRADE 60
4. ALLOWABLE SOIL BEARING PRESSURE.....2000 PSF
5. PLANK LOADS... SUPERIMPOSED DL=3 PSF, SUPERIMPOSED LL=68 PSF (SNOW)

B. FOUNDATIONS
1. ACTUAL SOIL BEARING CONDITIONS SHALL BE CONFIRMED PRIOR TO CONSTRUCTION, TEST RESULTS COPIED TO GHD.
2. PROVIDE SUFFICIENT TEMPORARY PROTECTION TO PREVENT ALL EXPOSED SUBGRADE FROM FREEZING. DO NOT PLACE CONCRETE OR BACKFILL OVER FROZEN SOIL.
3. KEEP ACCUMULATED RAIN WATER AND SURFACE RUNOFF AWAY FROM BEARING STRATUM. DO NOT ALLOW WATER TO STAND IN THE EXCAVATION AND SOFTEN THE SOILS AT OR BELOW BEARING LEVEL.
4. BASE SLAB MUST BEAR ON 6' OF COMPACTED GRAVEL OVER UNDISTURBED VIRGIN SOIL.
5. ALL BACKFILL MATERIAL SHALL BE CLEAN NATIVE FILL; BACKFILL HEIGHT; 14'-10" MINIMUM, 15'-10" MAXIMUM.

C. CONCRETE REINFORCING STEEL
1. CONCRETE COVER FOR REINFORCING STEEL SHALL BE AS FOLLOWS:
   2" CLEAR FROM ALL INSIDE AND OUTSIDE FACES
   3" CLEARANCE FOR FOOTINGS
2. ALL BENT AND STRAIGHT REINFORCING BARS SHALL BE 60 GRADE STEEL. ALL STEEL SIZES ARE IMPERIAL SIZES. HORIZONTAL BAR LAPPING SHALL BE AS FOLLOWS: #4-20", #5-25", #6-29", EXCEPT IN THE FLOOR WHERE THE #4 BAR LAP IS 16".
3. PROVIDE CORNERS TO MATCH ALL HORIZONTAL BARS WITH A 24" LAP. ADD ADDITIONAL HORIZONTAL CORNER BARS AT THE TOP OF ALL WALL INTERSECTIONS SO THAT THE TOP 2' HAS CORNER BARS EVERY 6'.

D. VINYL WATER STOP TO BE GREENSTREAK 705, 732, OR EQUAL WITH ALL JOINTS WELDED.

E. EXPANDING SEALANT SHALL BE: HYDROTILE (GREENSTREAK), ULTRA SEAL MC-2005T (ADEKA), SIKA SWELL (SIKA), LEAKMASTER (C. I. KASCO), OR SWELLSEAL (DE NEEF CONCHEM).

F. FENCE TO BE CONSTRUCTED 6' FROM OUTSIDE WALL PERIMETER TO PREVENT TRUCK, TRACTOR, AND COW TRAFFIC.

CONCRETE CURING
THE AGE OF STRIPPED CONCRETE OR SLABS SHALL BE AT LEAST 7 DAYS BEFORE ANY LOAD (INCLUDING BACKFILL) IS APPLIED OTHER THAN THE WEIGHT OF THE WALL, FORMS, SCAFFOLDS FOR SUCCEEDING LIFTS OR LIGHT EQUIPMENT.

BACKFILLING
ONCE THE CONCRETE IS PROPERLY CURED, 6' OF BACKFILL CAN BE PLACED AROUND THE TANK PRIOR TO PRECAST TOP BEING PERMANENTLY FASTENED. AVOID BACKFILL CONTAINING LARGE ROCKS, HARD OR FROZEN SOIL LUMPS, OR CONSTRUCTION DEBRIS.

EARTHFILL SHALL BE PLACED IN 10-INCH LIFTS, PRIOR TO COMPACTION. BACKFILL AROUND STRUCTURE GRADUALLY AND UNIFORMLY AROUND ALL SIDES OF THE STRUCTURE. COMPACT SOIL TO NOT LESS THAN 85% OF MAXIMUM DRY DENSITY ACCORDING TO ASTM D 698, STANDARD PROCTER TEST.

ADJACENT TO STRUCTURE
DO NOT OPERATE HEAVY COMPACTION EQUIPMENT WITHIN 6' OF THE STRUCTURES.

DO NOT OPERATE COMPACTION EQUIPMENT EQUIPMENT, IN EXCESS OF 15,000 LBS., BETWEEN 6' AND 2' OF THE STRUCTURES. EARTHFILL SHALL BE PLACED IN 8-INCH LIFTS (PRIOR TO COMPACTION). COMPACT IN A MANNER ADEQUATE TO PREVENT DAMAGE AND ALLOW THE STRUCTURE TO GRADUALLY AND UNIFORMLY ASSUME THE BACKFILL LOADS.

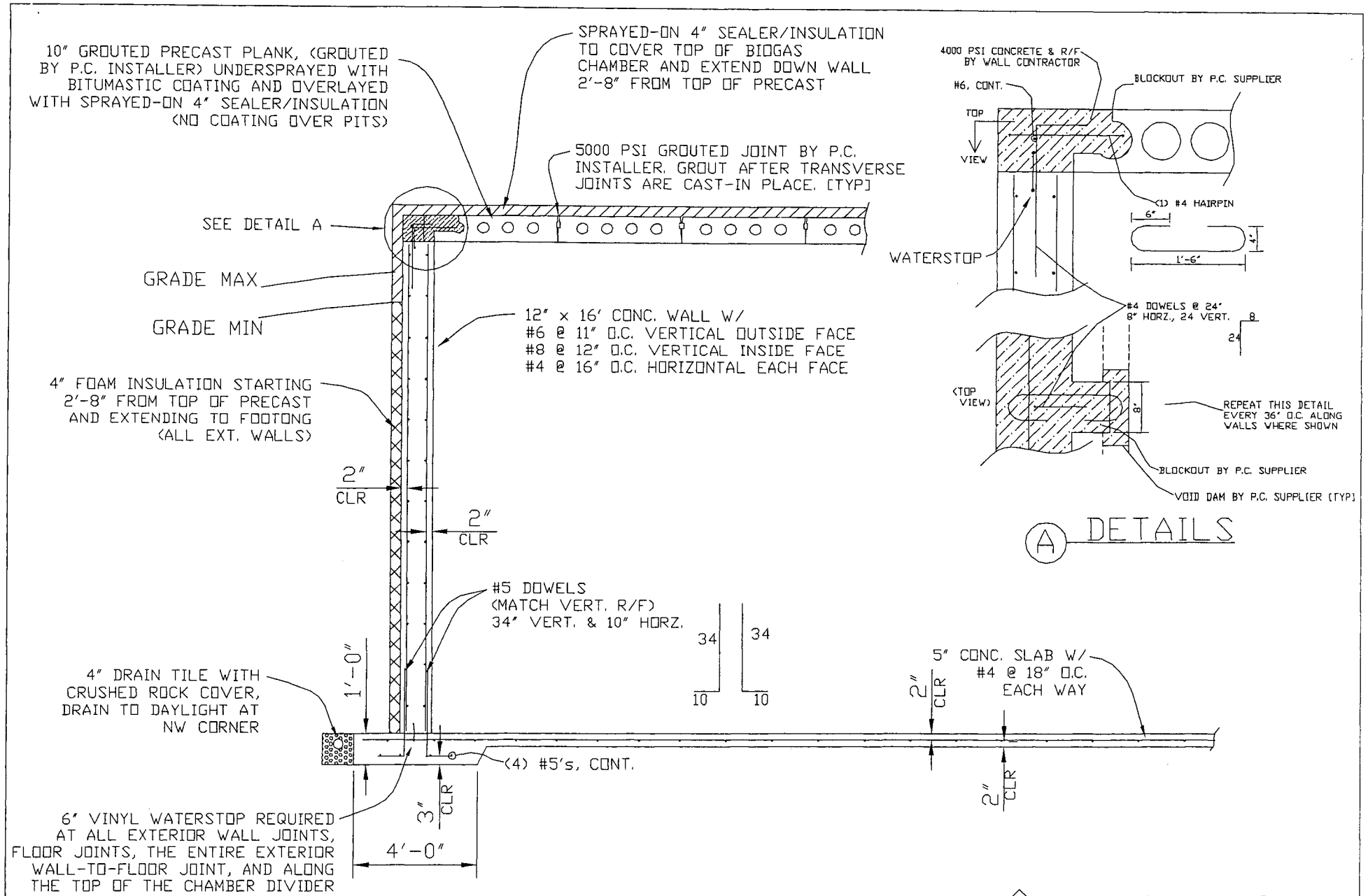
COMPACTION SHALL BE ACCOMPLISHED BY MEANS OF MANUALLY DIRECTED POWER TAMPERS OR PLATE VIBRATORS WITHIN 2' OF STRUCTURES. EARTHFILL SHALL BE PLACED IN 4-INCH LIFTS (PRIOR TO COMPACTION). COMPACT IN A MANNER ADEQUATE TO PREVENT DAMAGE TO THE STRUCTURE AND ALLOW THE STRUCTURE TO GRADUALLY AND UNIFORMLY ASSUME THE BACKFILL LOADS.

GRADING
THE TANK SITE SHALL BE GRADED TO PROVIDE DRAINAGE AWAY FROM THE TANK AT A MINIMUM OF 1% SLOPE.

OPERATION
DAY TO DAY OPERATION OF HEAVY EQUIPMENT IS PROHIBITED WITHIN 6' OF PERMANENT STRUCTURE WALLS.

CONSTRUCTION NOTE: -PRECAST PLANK CONSTRUCTION PLANS SHALL BE REVIEWED BY GHD PRIOR TO ACCEPTANCE.

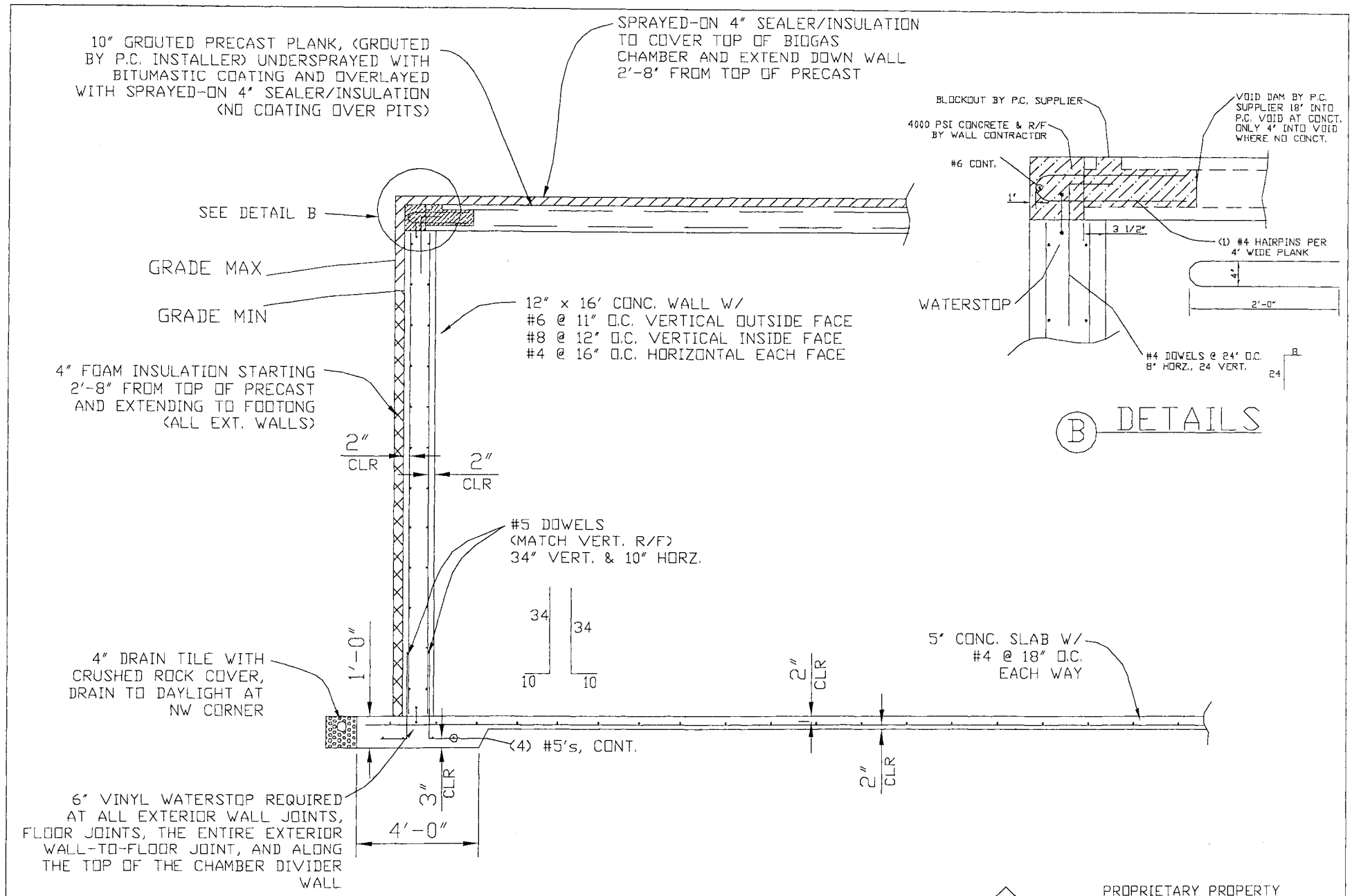
Title: TRADITION SOUTH DAIRY			
Company: GHD, Inc.		Drawn By: DgDimensions	
		Scale: FIT	Date: 1/13/09
Location: Chilton, WI		Approved By:	Page: 4



OUTER NON-LOAD BEARING WALLS (1)

(N/S 146'-8" LONG WALLS EXCEPT BY PITS)

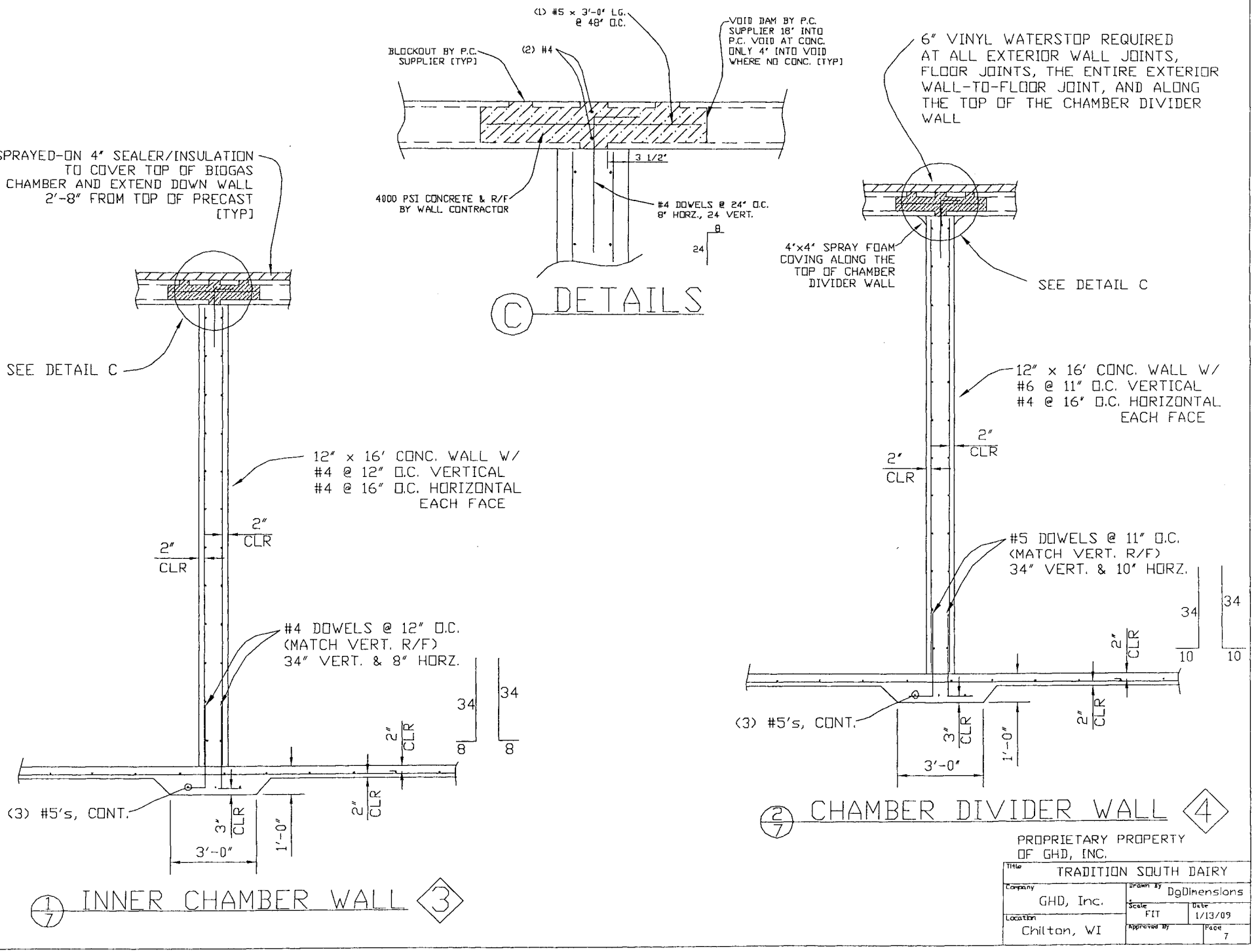
Title: TRADITION SOUTH DAIRY			
Company: GHD, Inc.		Drawn By: DgDimensions	
		Scale: FIT	Date: 1/13/09
Location: Chilton, WI		Approved By:	Page: 5



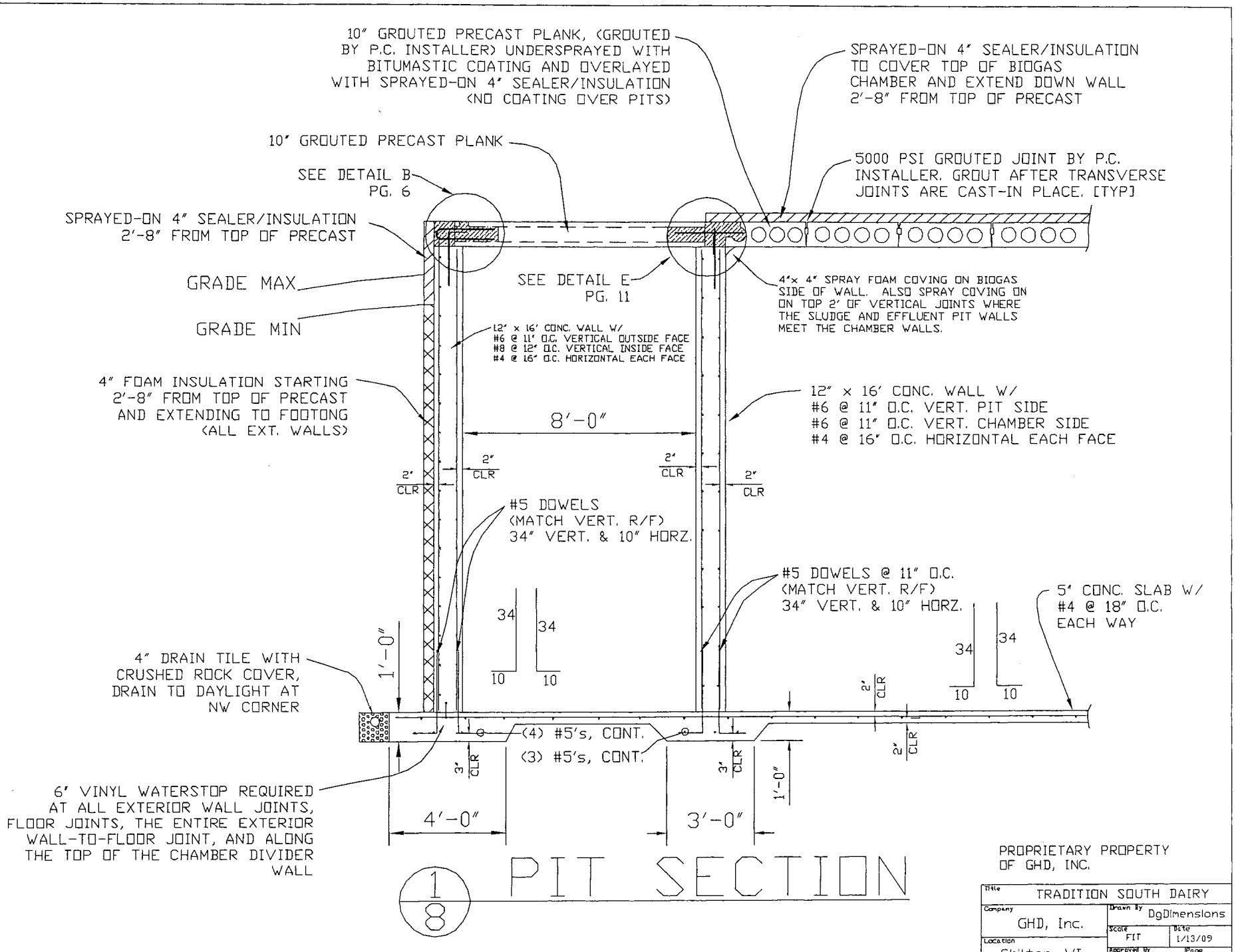
OUTER LOAD BEARING WALLS (2)

(E/W 304' LONG WALLS)

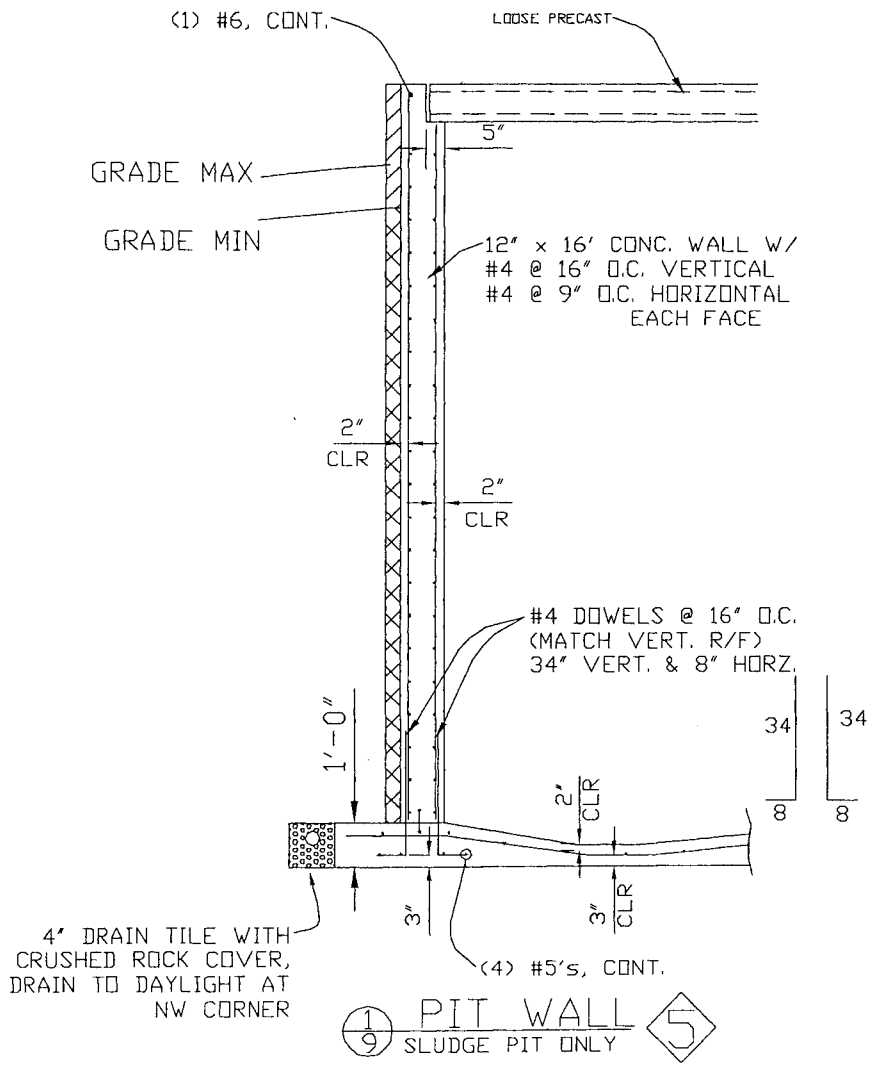
Title	TRADITION SOUTH DAIRY		
Company	GHD, Inc.	Drawn By	DgDimensions
		Scale	FIT
		Date	1/13/09
Location	Chilton, WI	Approved By	
		Page	6



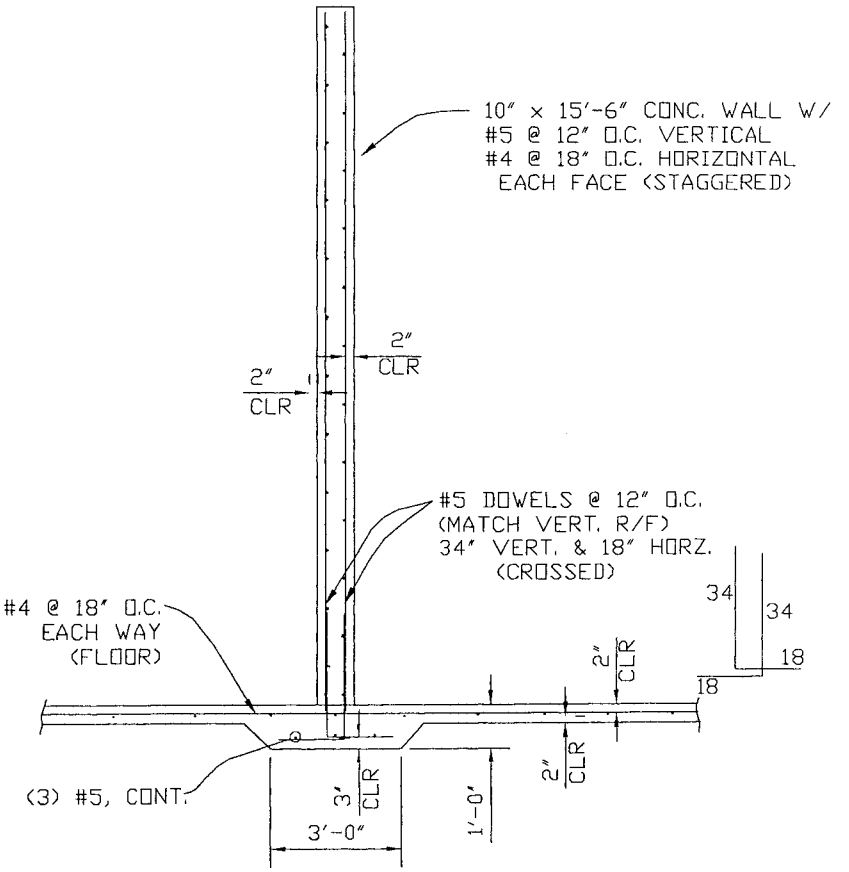
Title	TRADITION SOUTH DAIRY		
Company	GHD, Inc.	Drawn By	DgDimensions
		Scale	FIT
		Date	1/13/09
Location	Chilton, WI	Approved By	
		Page	7



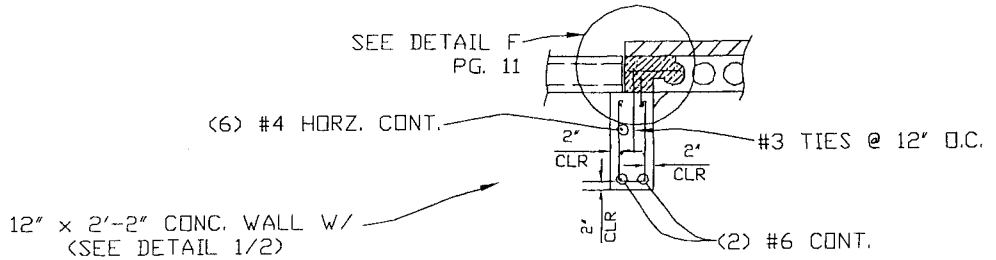
Title: TRADITION SOUTH DAIRY			
Company: GHD, Inc.	Drawn By: DgDimensions		
Location: Chilton, WI	Scale: FIT	Date: 1/13/09	
	Approved by:	Page: 8	



1/9 PIT WALL 5
SLUDGE PIT ONLY

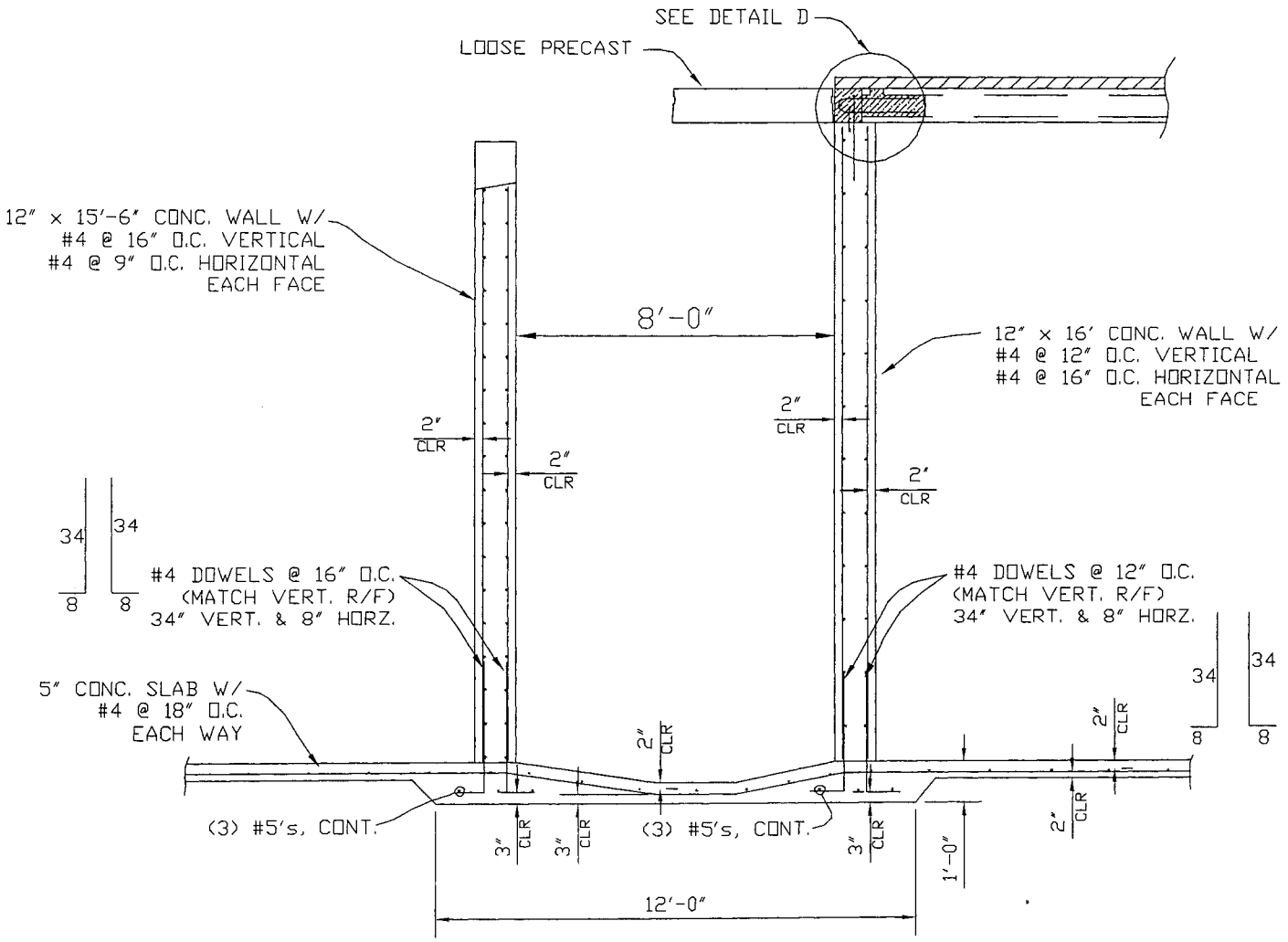


2/9 PARTITION WALLS 6



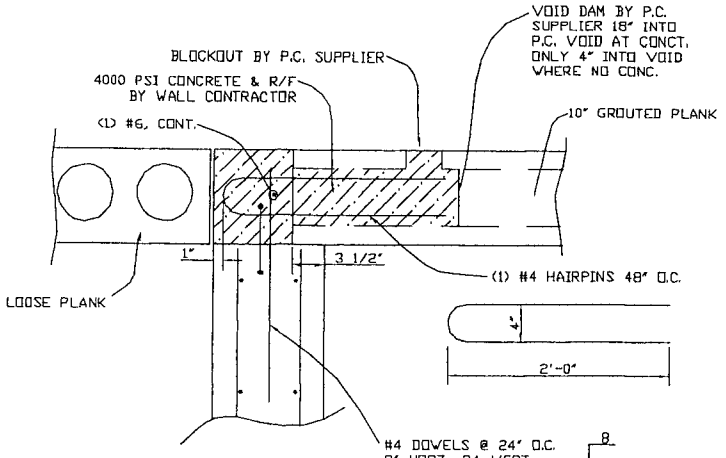
3/9 ELEVATED WALL 7
SLUDGE PIT

Title: TRADITION SOUTH DAIRY			
Company: GHD, Inc.		Drawn By: DgDimensions	
Location: Chilton, WI		Scale: FIT	Date: 1/13/09
		Approved By:	Page: 9



1/10 SLUDGE PIT SECTION

Title: TRADITION SOUTH DAIRY			
Company: GHD, Inc.	Drawn By: DgDimensions		
	Scale: FIT	Date: 1/13/09	
Location: Chilton, WI	Approved By:	Page: 10	



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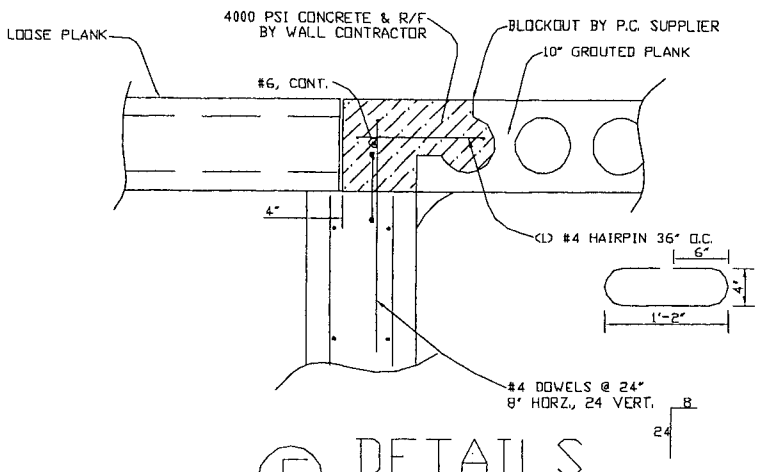

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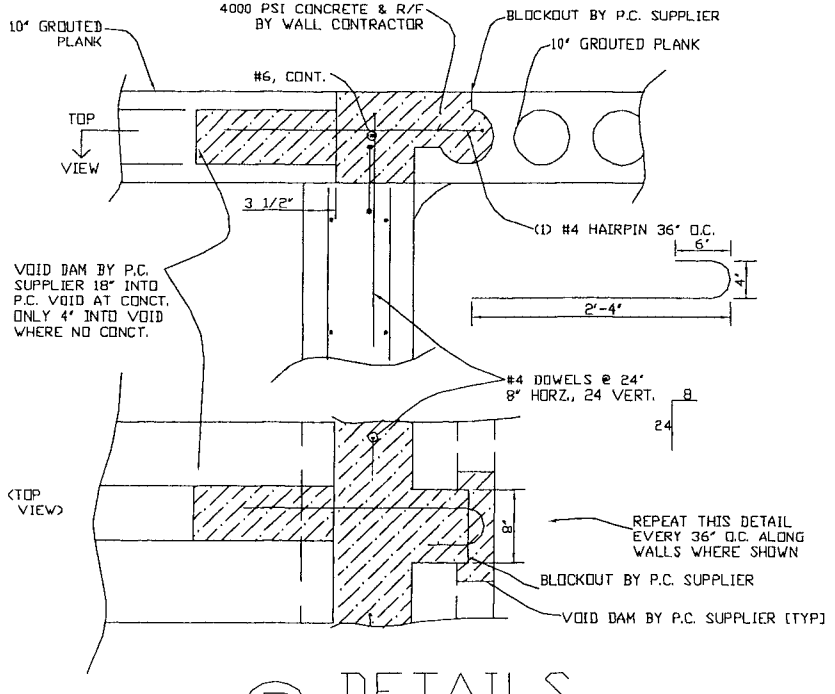

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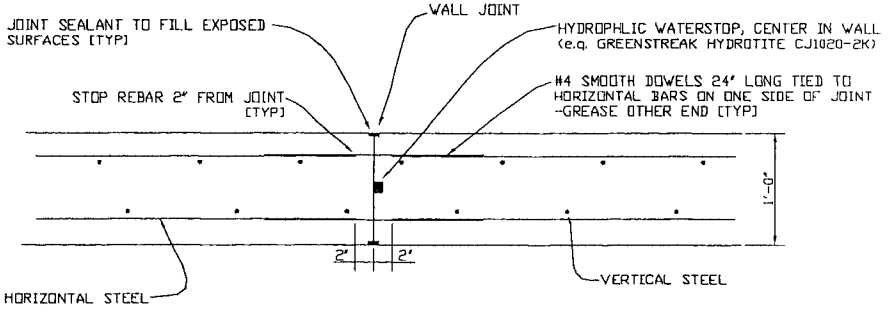
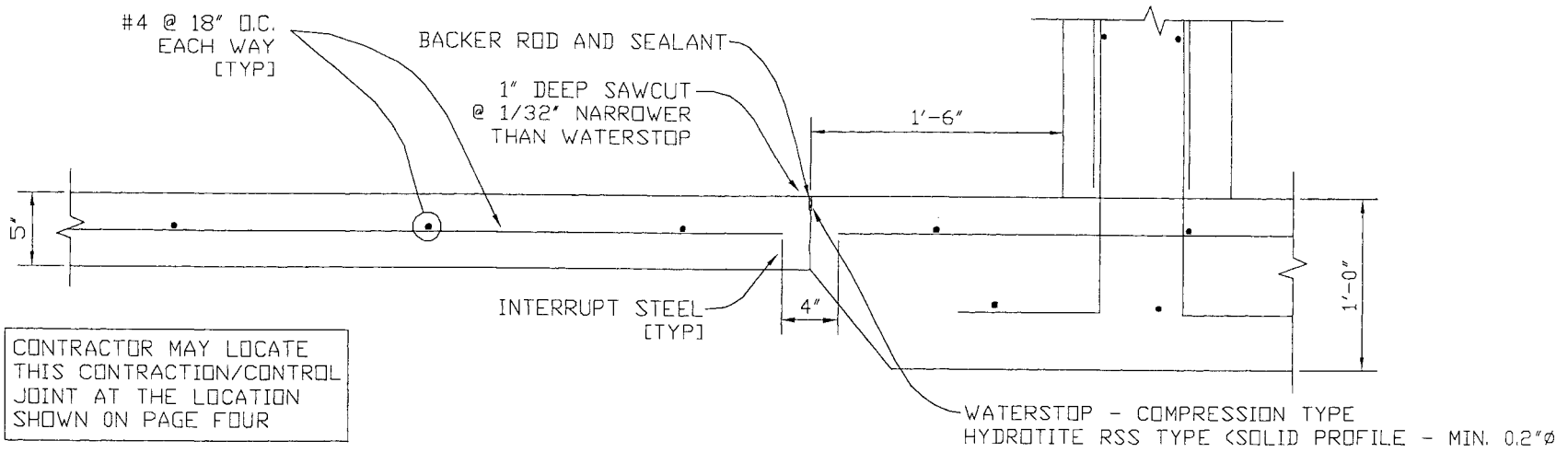


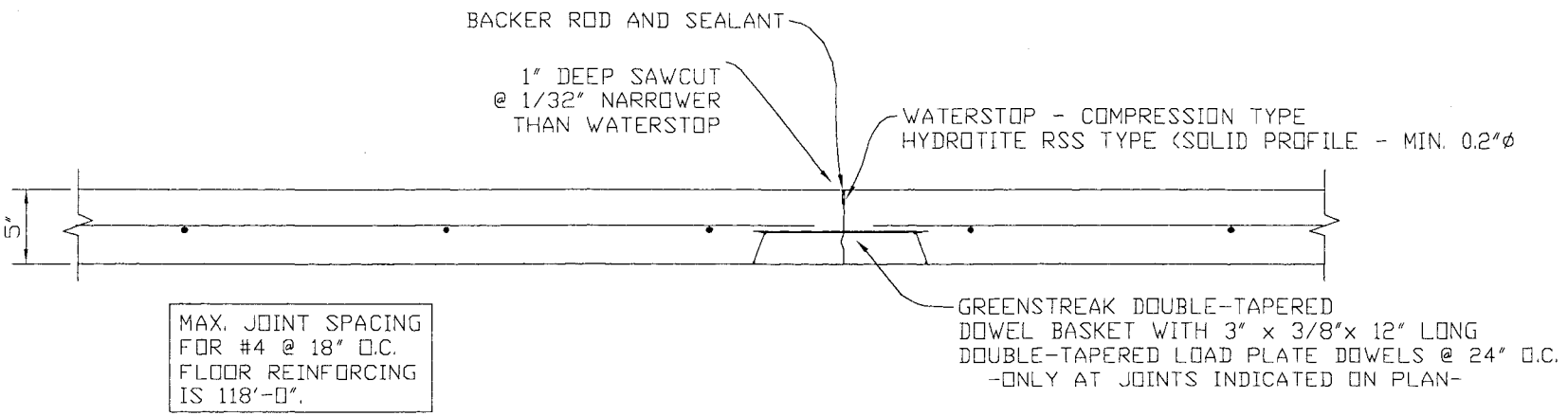
1/11 WALL CONSTRUCTION/CONTRACTION JOINT

PLAN VIEW

Title	TRADITION SOUTH DAIRY		
Company	GHD, Inc.	Drawn By	DgDimensions
		Scale	FIT
		Date	1/13/09
Location	Chilton, WI	Approved By	
		Page	11



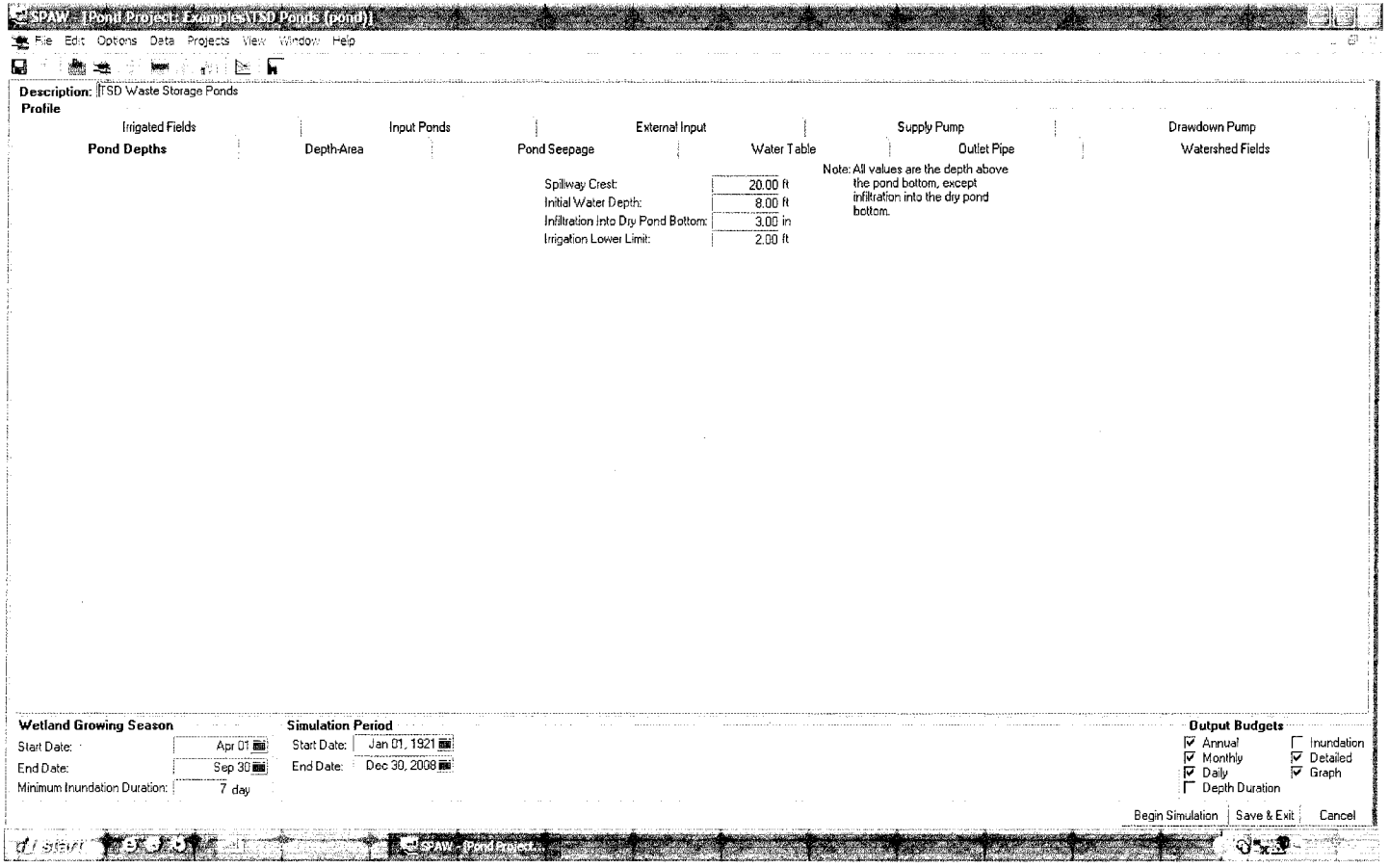
1/12 FLOOR CONTRACTION/CONTROL JOINT



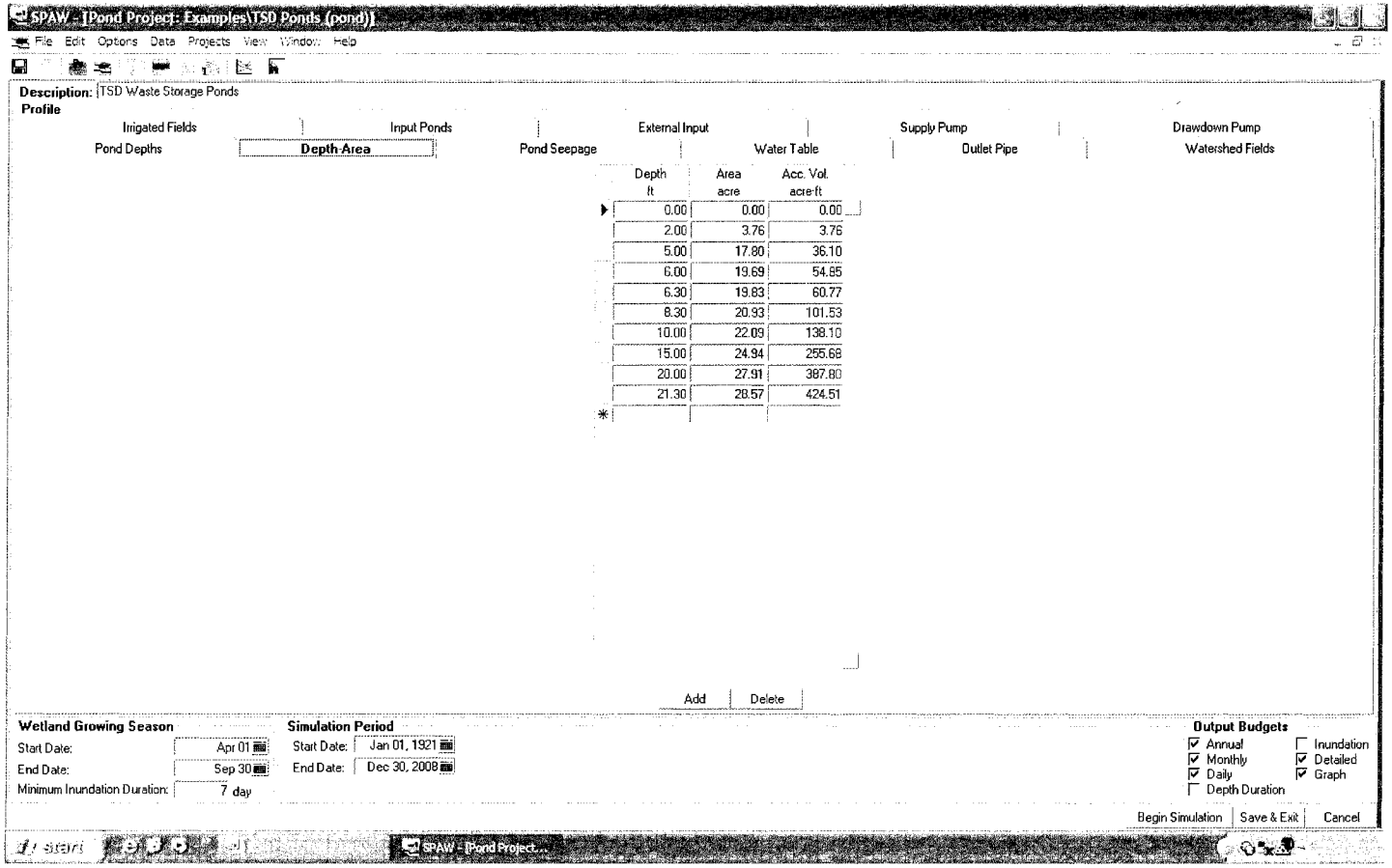
2/12 FLOOR CONTRACTION/CONTROL JOINT

Title: TRADITION SOUTH DAIRY	
Company: GHD, Inc.	Drawn By: DgDimensions
Location: Chilton, WI	Scale: FIT; Date: 1/13/09
	Approved By: ; Page: 12

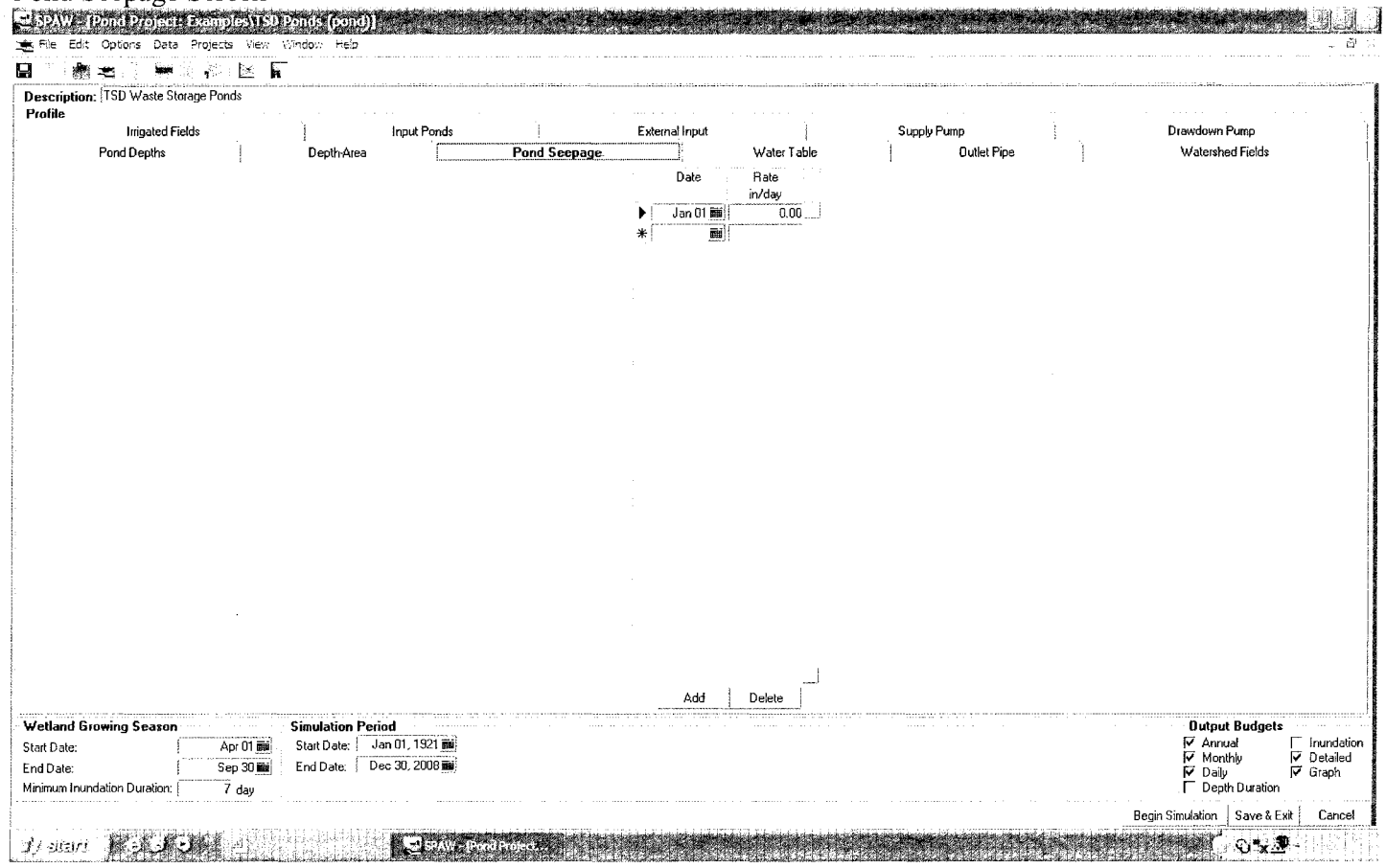
TSD Ponds
Pond Depth Screen



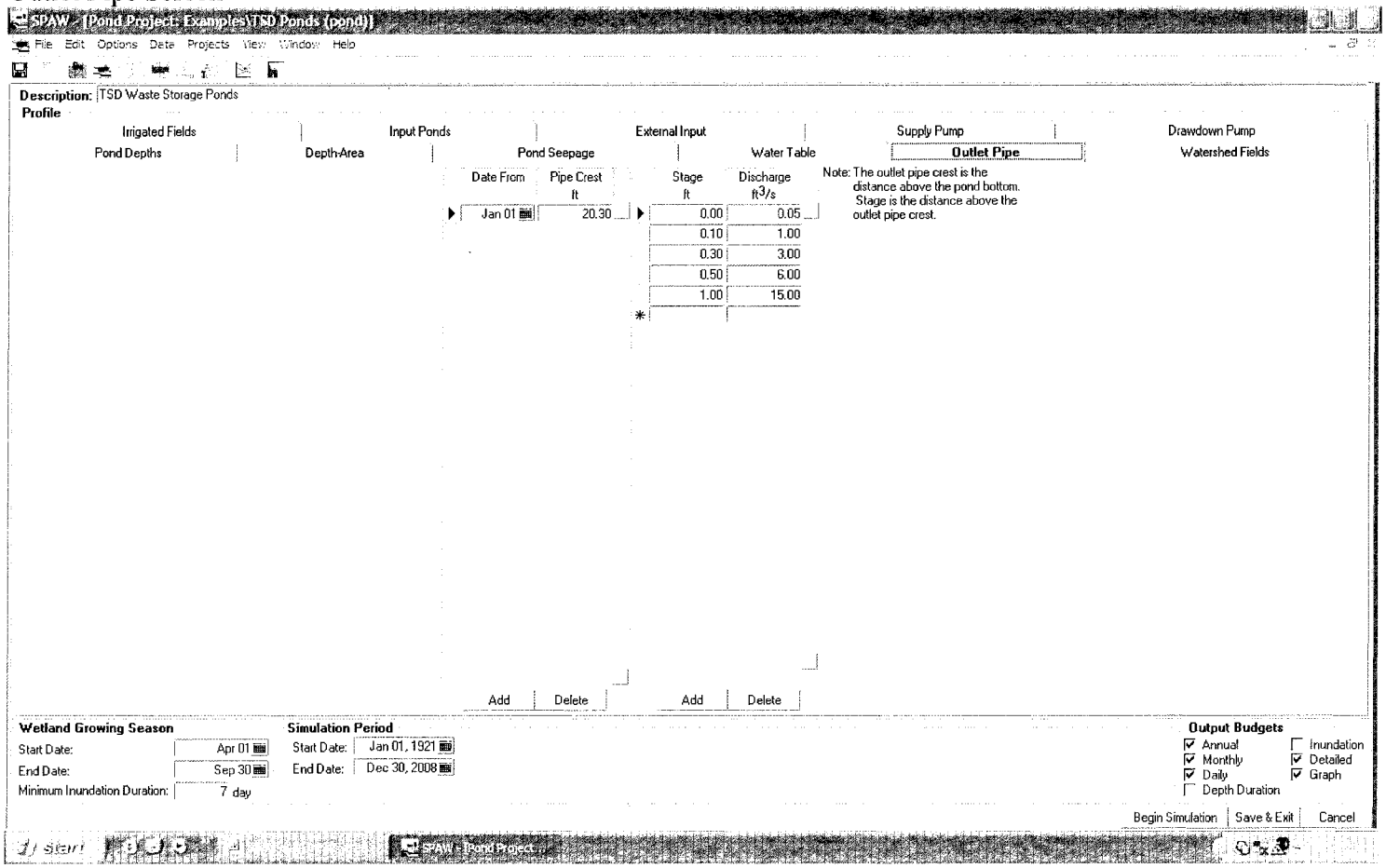
Depth-Area Screen



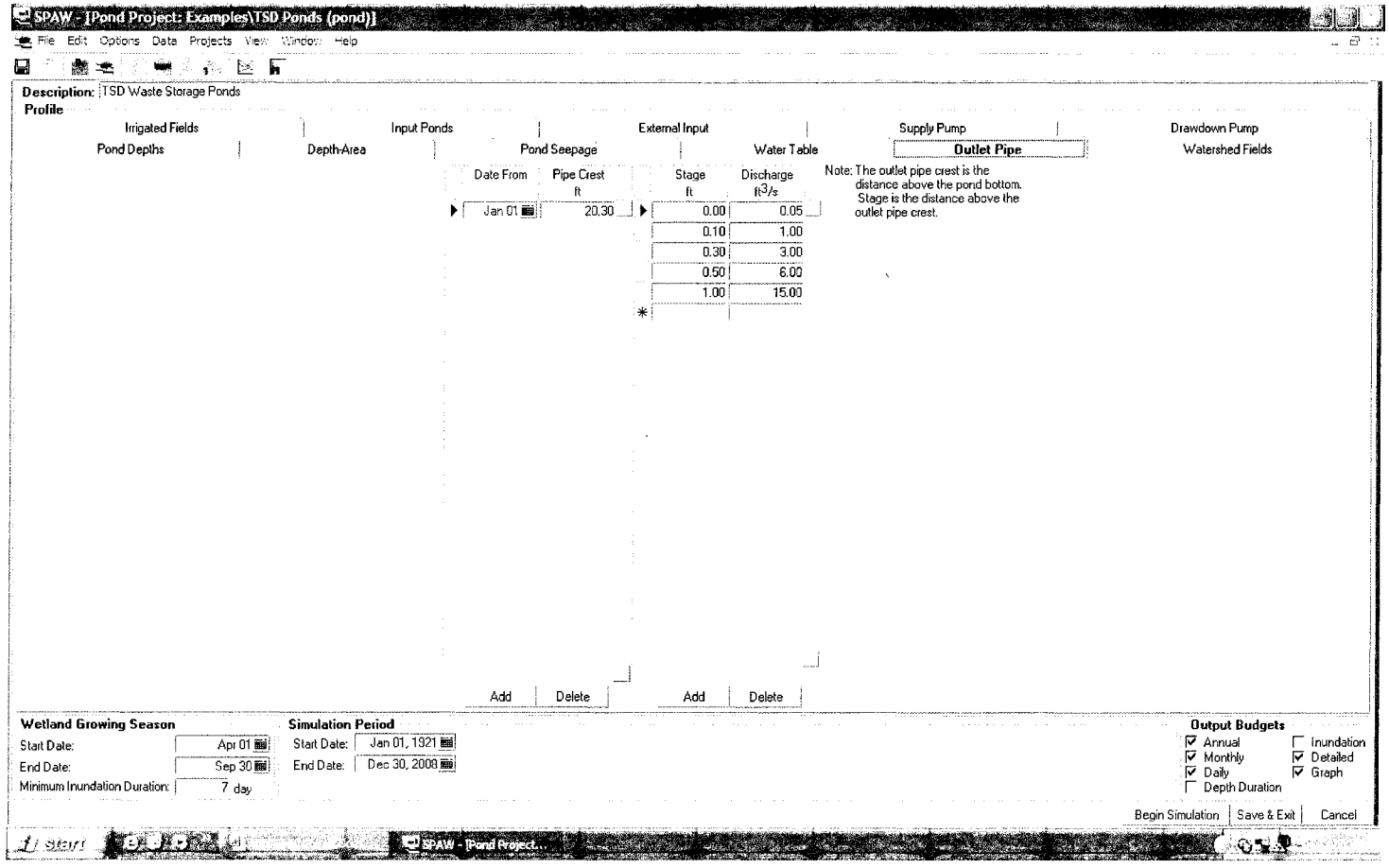
Pond Seepage Screen



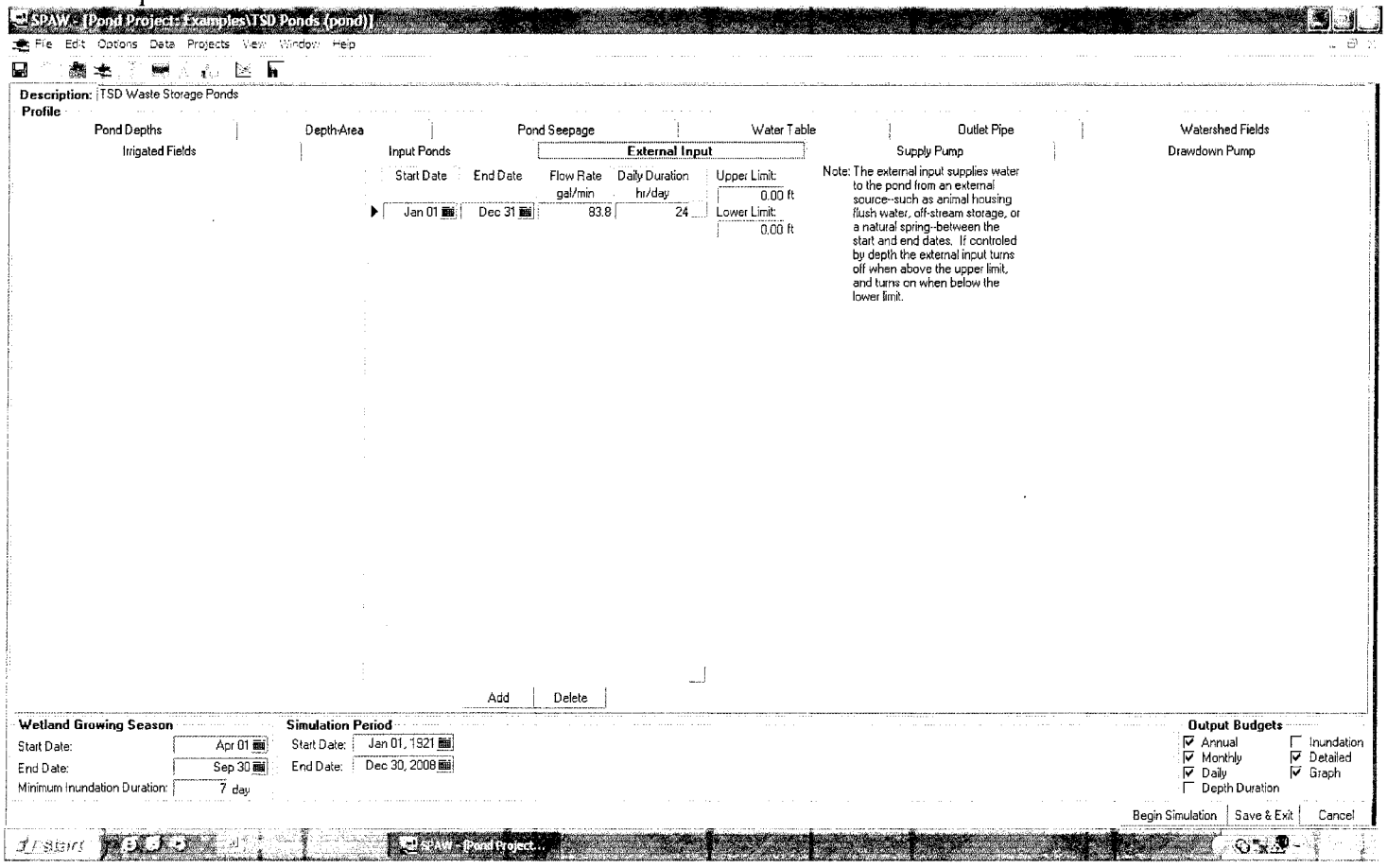
Outlet Pipe Screen



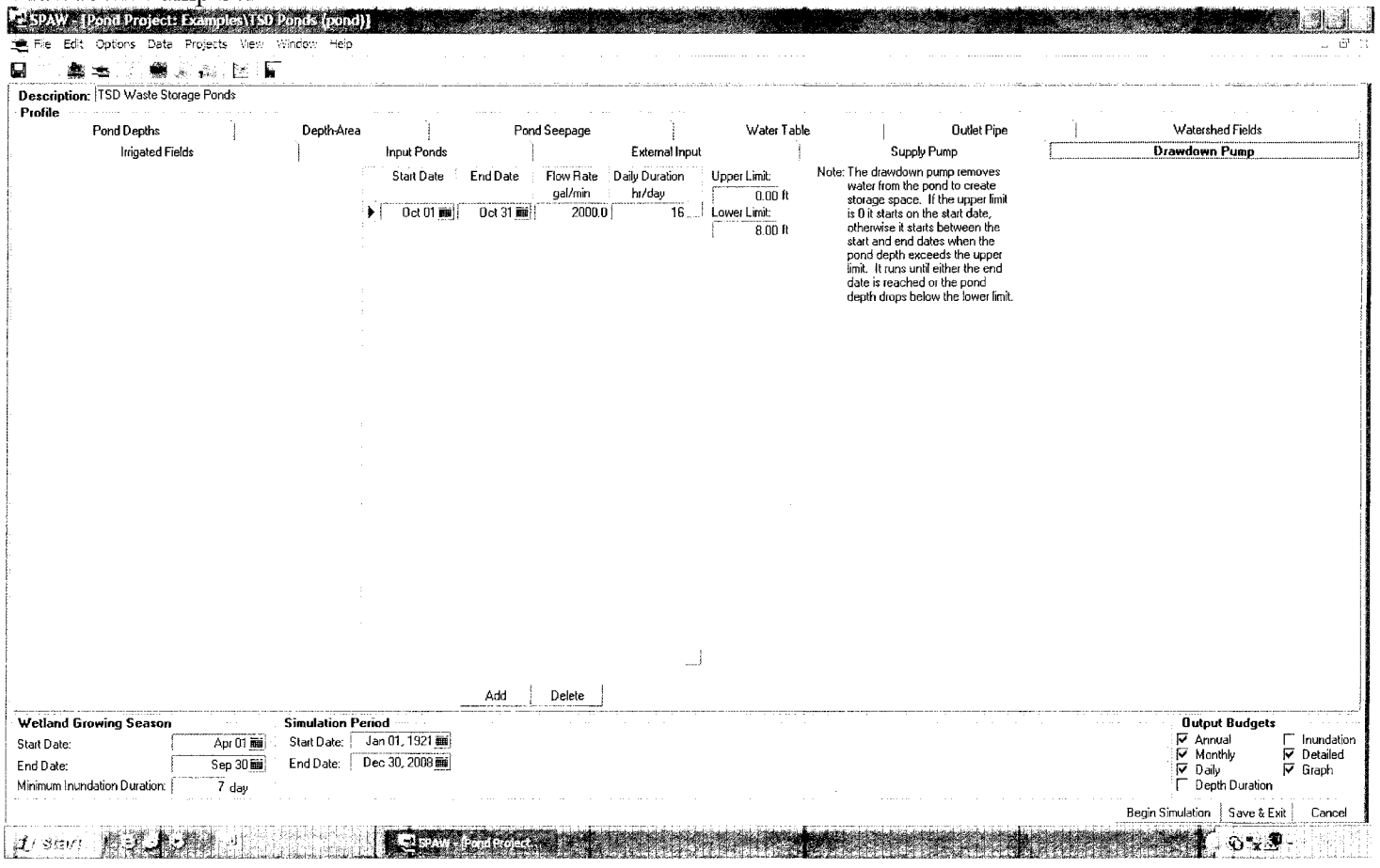
Watershed Fields Screen



External Input Screen



Drawdown Pump Screen

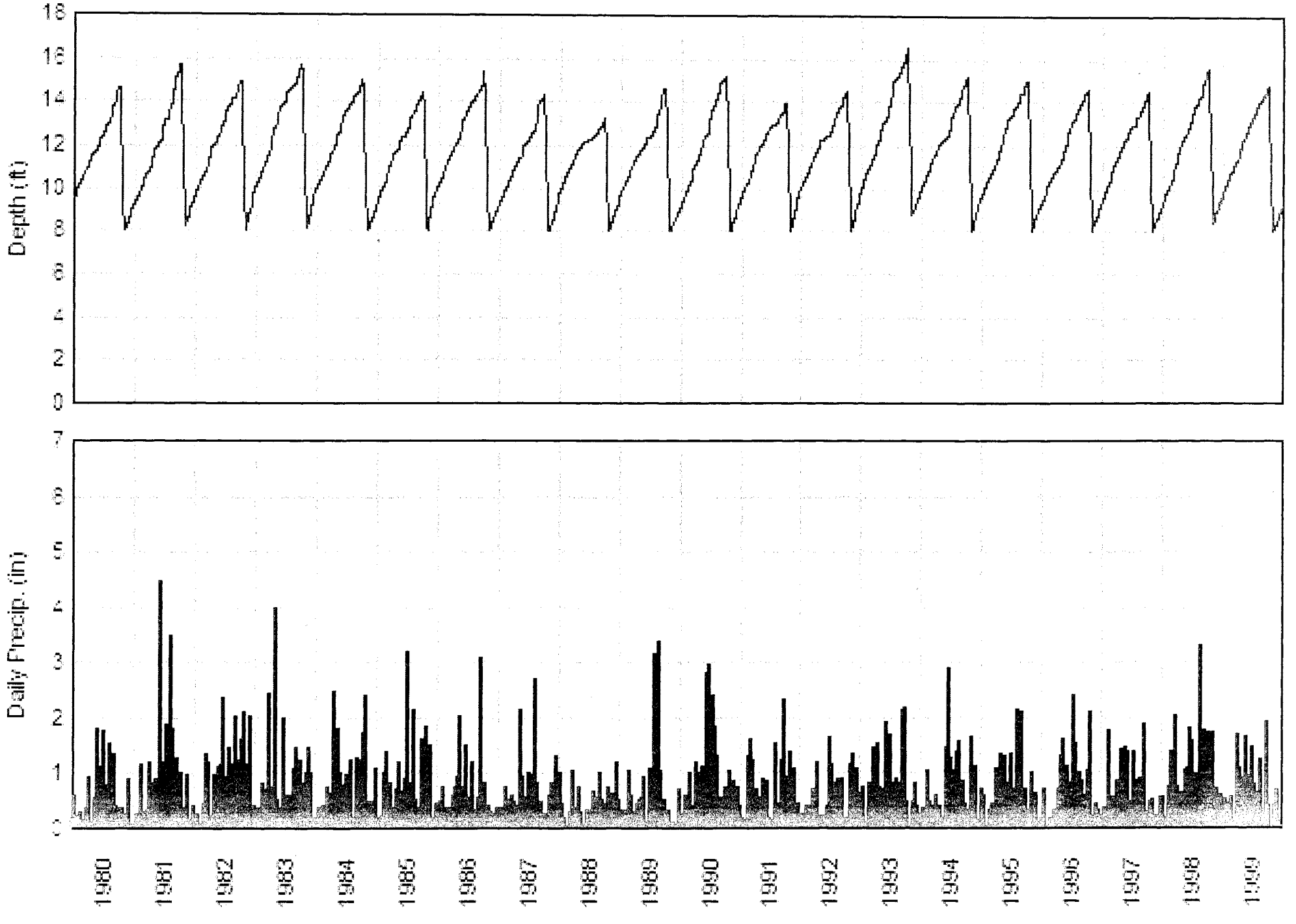


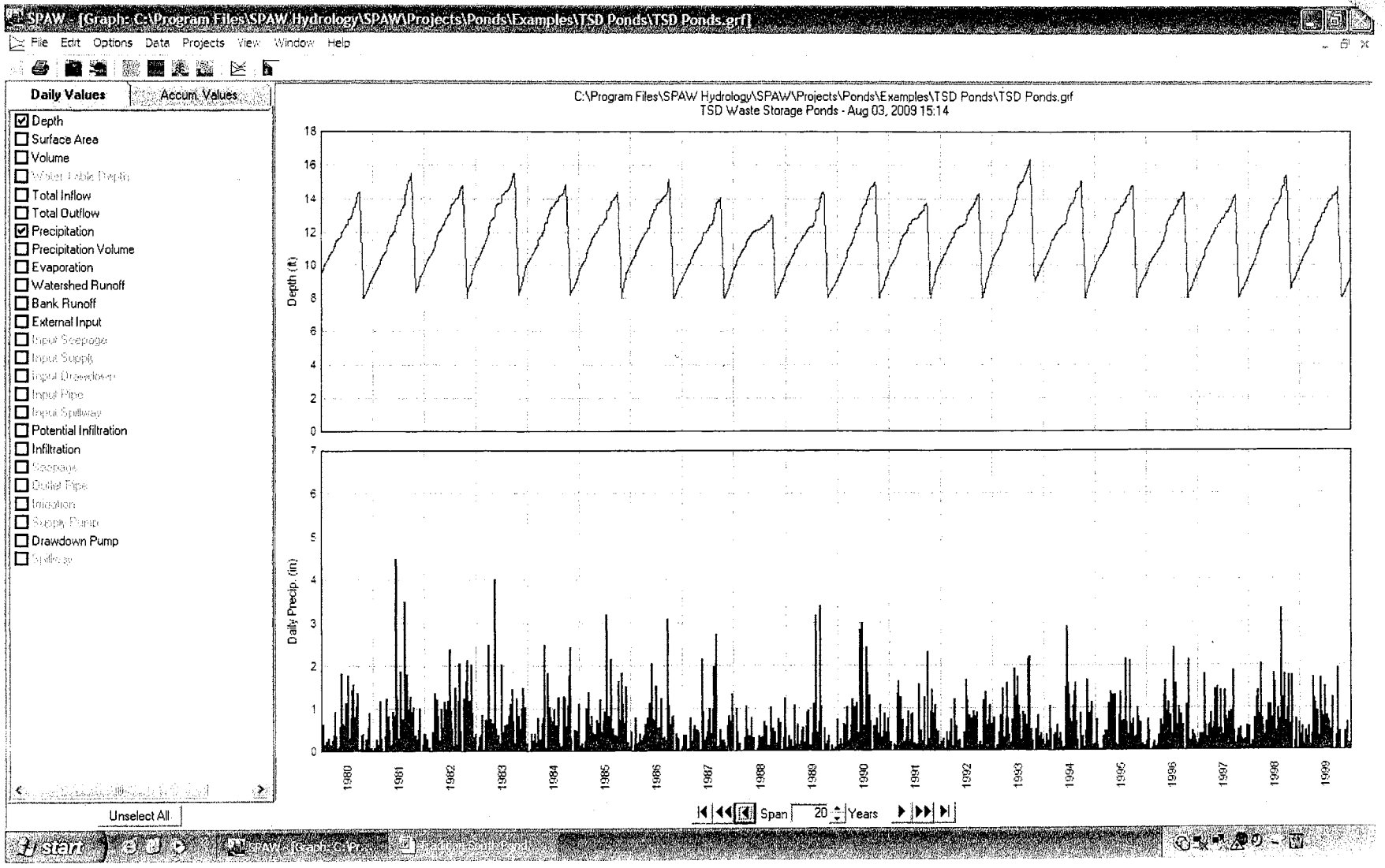
Elev.	Pond Area, Square Ft.			Total Area, Acres	Avg. Area, Acres	Interval, Ft.	Interval Volume, Ac. Ft.	Total Volume, Ac. Ft.
	16	17	14					
970	0	0	0	0				0
					1.88	2	3.76	
972	163,800	0	0	3.76				3.76
					10.78	3	32.34	
975	409,500	365,800	0	17.80				36.10
					18.745	1	18.75	
976	418,656	438,960	0	19.69				54.85
					19.76	0.3	5.93	
976.3	440,300	442,068	0	19.83				60.78
					20.38	2	40.76	
978.3	440,300	450,631	20,700	20.93				101.54
					21.51	1.7	36.57	
980	456,000	476,784	29,330	22.09				138.11
					23.515	5	117.57	
985	504,300	525,684	56,420	24.94				255.68
					26.425	5	132.13	
990	554,400	576,384	85,310	27.91				387.81
					28.24	1.3	36.71	
991.3	568,064	583,280	93,318	28.57				424.52

Stage vs Storage for TSD Ponds 16, 17, and 14.

Q6

C:\Program Files\SPAW Hydrology\SPAW\Projects\Ponds\Examples\TSD Ponds wo 14\TSD Ponds wo 14.grf
TSD Waste Storage Ponds w/o 14 - Apr 20, 2010 11:21




SPAW - [Graph: C:\Program Files\SPAW Hydrology\SPAW\Projects\Ponds\Examples\TSD Ponds\TSD Ponds.grf]
File Edit Options Data Projects View Window Help
Daily Values
Accum. Values
Depth
Surface Area
Volume
Water Table Depth
Total Inflow
Total Outflow
Precipitation
Precipitation Volume
Evaporation
Watershed Runoff
Bank Runoff
External Input
Input Seepage
Input Supply
Input Drawdown
Input Pipe
Input Spillway
Potential Infiltration
Infiltration
Seepage
Outlet Pipe
Irrigation
Supply Pump
Drawdown Pump
Spillway
Unselect All
C:\Program Files\SPAW Hydrology\SPAW\Projects\Ponds\Examples\TSD Ponds\TSD Ponds.grf
TSD Waste Storage Ponds - Aug 03, 2009 15:14
Depth (ft)
Daily Precip. (in)
1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999
Span 20 Years
start

Tradition Family Dairy - Daily Application Log

Field: F6659-T5540-8 (SE CRN of field)

Crop: Corn Silage

Date	Total Amount (gal/tons)	Acres	Rate, gal/tons per acre	Source	Application Method[1]	Wind Direction	Wind Speed	Weather Conditions[2]	Air Temp	Soil Moisture[3]	24hr Precip Previous	24hr Precip Post
1/10/2009	353620	25.3	14000	Silage leachate	B	NW	10	OC	17	SC	Y	Y
2/18/2009	374150	26.7	14000	Silage leachate	B	NW	5	OC	28	SC	N	N
3/2/2009	171620	12.3	14000	Silage leachate	B	SE	0	PC	18	FR	N	N
3/10/2009	175000	12.5	14000	Silage leachate	B	SW	5	OC	45	S	Y	Y
3/17/2009	46500	3.3	14000	Silage leachate	I	SW	7	S	58	D	N	N
3/25/2009	45000	3.2	14000	Silage leachate	I	SW	9	OC	38	S	Y	N
3/27/2009	140000	10.0	14000	Silage leachate	I	NW	10	PC	34	SC	N	Y
3/28/2009	120000	8.6	14000	Silage leachate	I	NE	3	PC	30	SC	N	Y
4/3/2009	90000	6.4	14000	Silage leachate	I	NW	8	PC	40	W	Y	N
5/2/2009	22500	1.6	14000	Silage leachate	I	W	3	PC	52	W	Y	N
5/3/2009	75000	5.4	14000	Silage leachate	I	W	0	S	54	W	N	N
5/5/2009	122500	8.8	14000	Silage leachate	I	SW	5	PC	60	D	N	Y
5/6/2009	32500	2.3	14000	Silage leachate	I	SW	8	PC	63	W	Y	Y
5/17/2009	130000	9.3	14000	Silage leachate	I	NW	5	S	50	D	N	Y
6/6/2009	35000	2.5	14000	Silage leachate	I	NE	5	PC	58	D	N	Y
6/8/2009	90000	6.4	14000	Silage leachate	I	N	11	PC	65	W	Y	N
6/14/2009	72500	5.2	14000	Silage leachate	I	NW	1	S	66	W	Y	N
6/15/2009	31000	2.2	14000	Silage leachate	I	SE	2	S	68	W	N	Y
6/26/2009	80000	5.7	14000	Silage leachate	I	NW	0	S	76	W	Y	Y
7/9/2009	60000	4.3	14000	Silage leachate	I	SE	1	S	63	W	Y	Y
7/12/2009	60000	4.3	14000	Silage leachate	I	NW	4	S	64	W	Y	N
7/16/2009	150000	10.7	14000	Silage leachate	I	W	7	S	66	W	Y	Y
7/17/2009	103000	7.4	14000	Silage leachate	I	W	6	PC	58	W	N	N
7/18/2009	90000	6.4	14000	Silage leachate	I	NW	6	PC	58	W	Y	N
8/1/2009	60000	4.3	14000	Silage leachate	B	SW	5	PC	68	D	N	N
8/12/2009	120000	8.6	14000	Silage leachate	B	SW	0	S	71	D	N	N
8/20/2009	60000	4.3	14000	Silage leachate	B	SW	5	PC	68	W	Y	Y
8/30/2009	55000	3.9	14000	Silage leachate	B	N	8	S	56	D	N	N
9/4/2009	7300	0.5	14000	Silage leachate	B	W	3	S	85	D	N	N
9/5/2009	155100	11.1	14000	Silage leachate	B	W	3	PC	85	D	N	N
9/6/2009	75000	5.4	14000	Silage leachate	B	W	3	S	85	D	N	N
10/17/2009	70000	5.0	14000	Silage leachate	B	W	1	OC	55	W	N	N
11/13/2009	365400	26.1	14000	Silage leachate	B	E	5	S	55	F	N	N
1/22/2010	296150	21.2	14000	Silage leachate	B	E	2	OC	15	FR	N	N
2/9/2010	227200	16.2	14000	Silage leachate	B		0	OC	10	FR	N	N
3/16/2010	120700	8.6	14000	Silage leachate	B		0	PC	62	W	N	N
3/17/2010	267750	19.1	14000	Silage leachate	B		0	S	60	W	N	N
3/18/2010	7728	0.6	14000	Silage leachate	B	E	4	S	70	W	N	N
4/11/2020	119500	8.5	14000	Silage leachate	B	W	5	S	75	D	N	N
4/12/2010	203115	14.5	14000	Silage leachate	B	W	10	OC	75	D	N	N

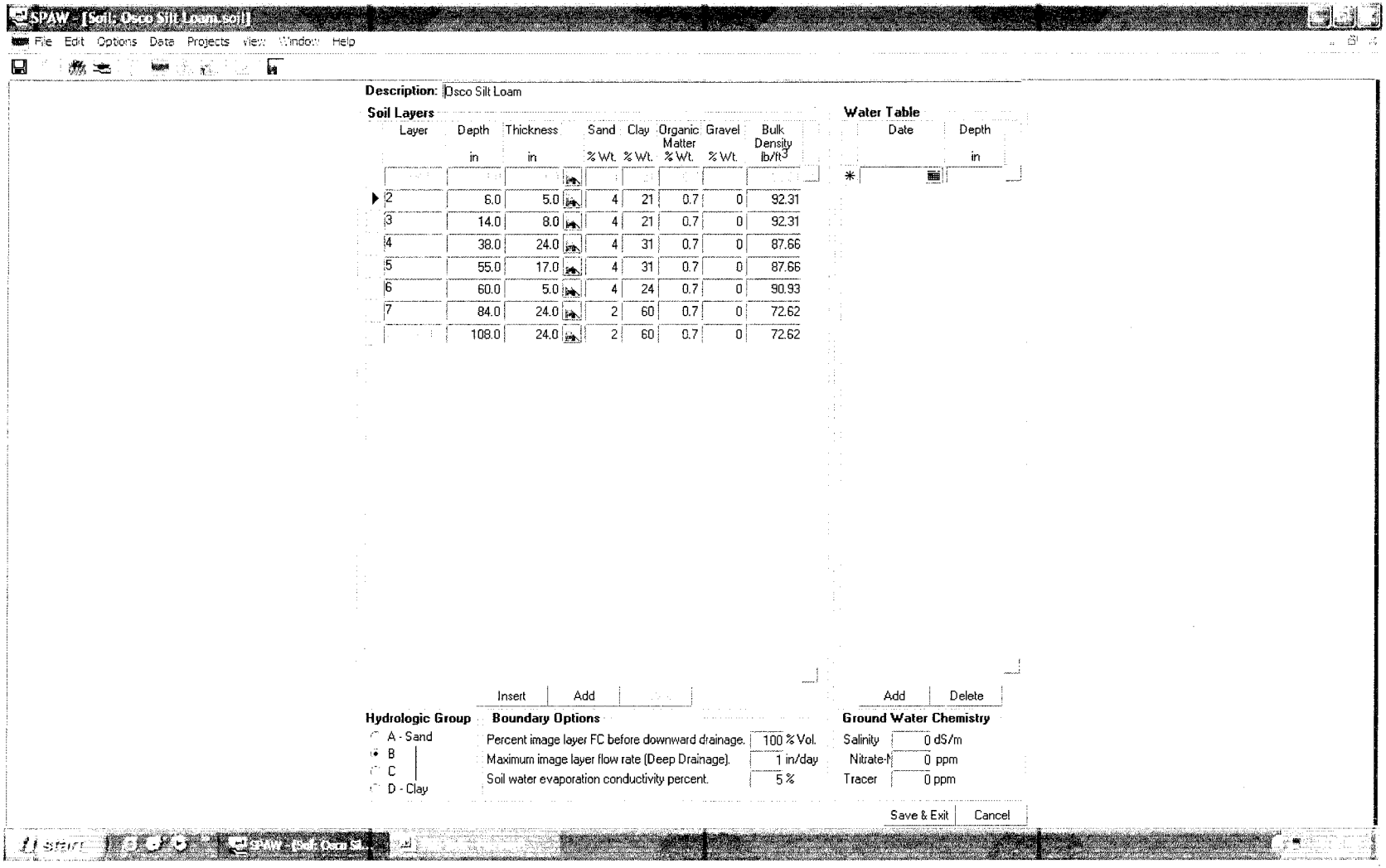
1- Application Method: B=Broadcast, no incorporation; BI=Broadcast, incorporation same day; K=knife injected; S-Sweep injected; I=Irrigation

2 - Weather Conditions: S=Sunny, PS=Partly Sunny, PC=Partly Cloudy, C=Cloudy, OC=Overcast

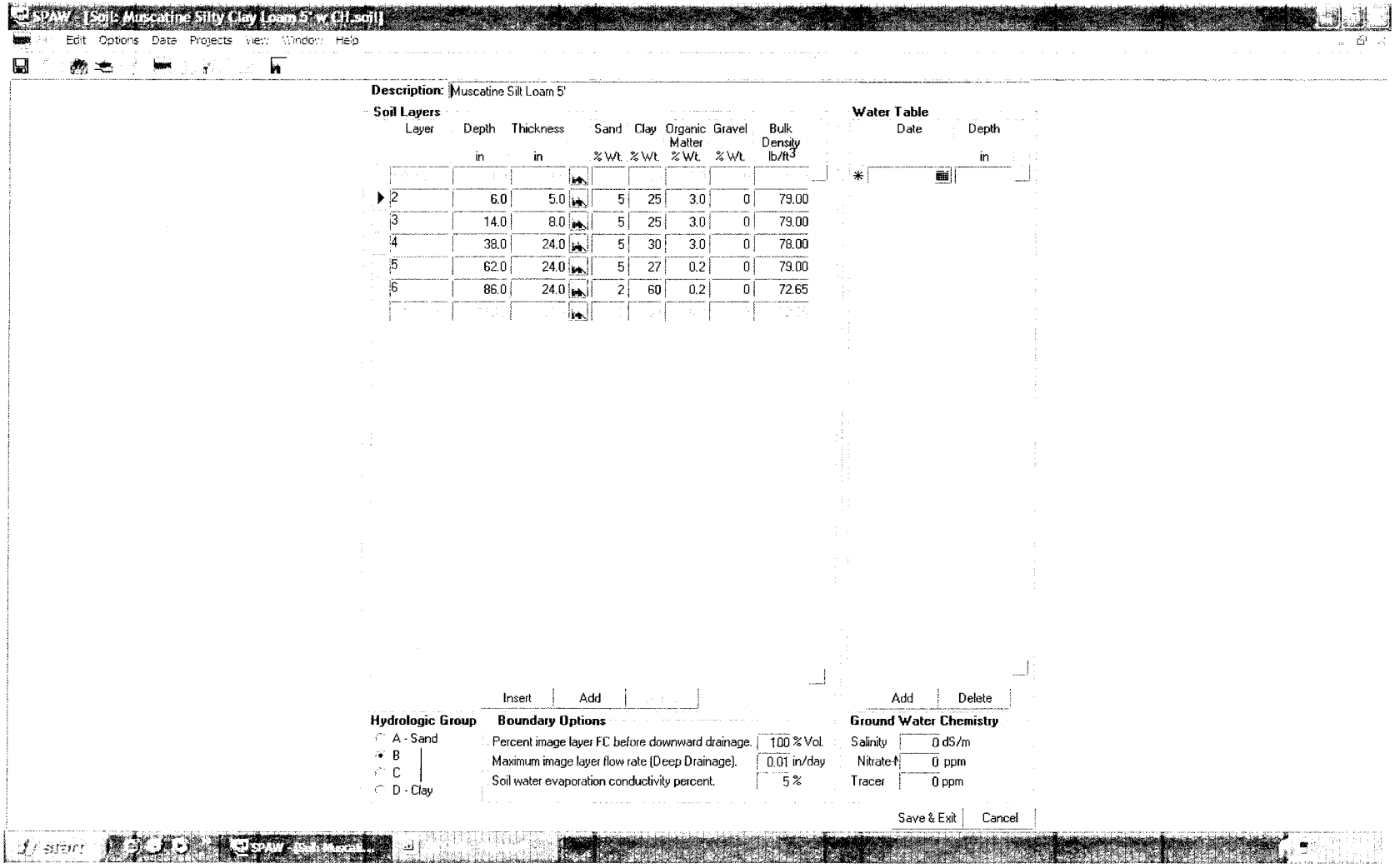
3 - Soil Moisture: D=Dry, W=Wet, S=Saturated, FR=Frozen, SC=Snow covered

Q 9

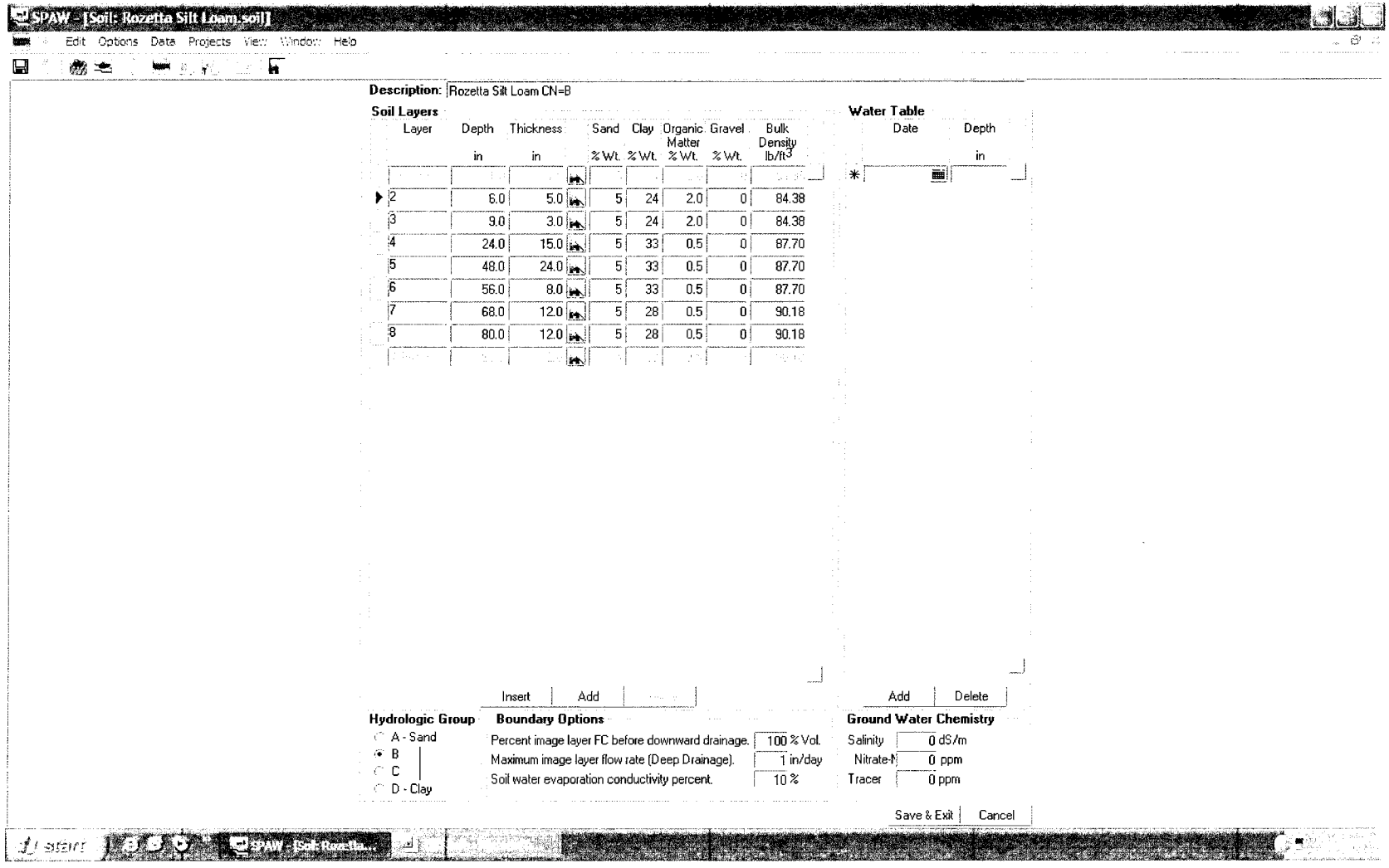
TSD Soils – Osco Silt Loam



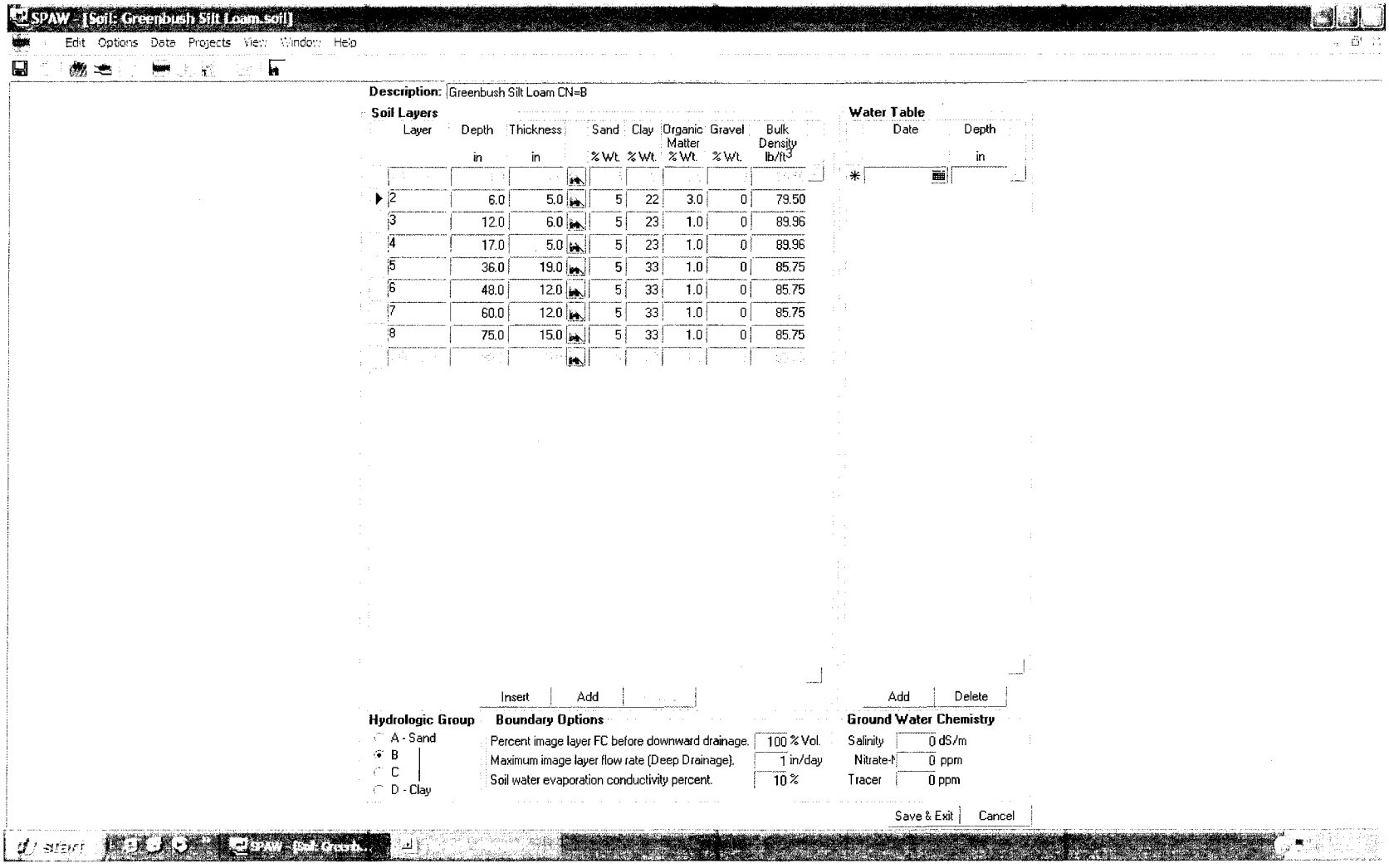
Muscatine Silt Loam



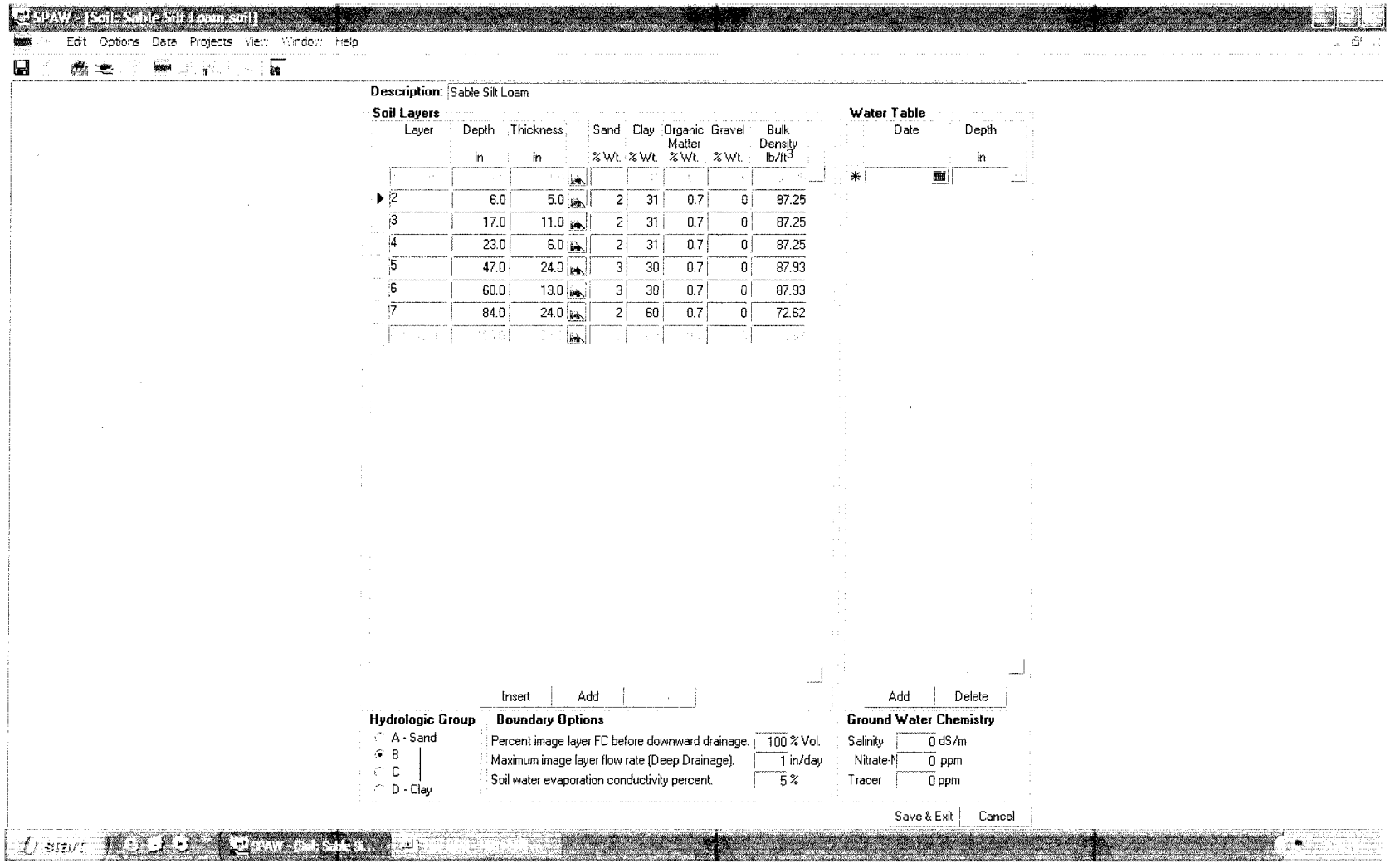
Rozetta Silt Loam



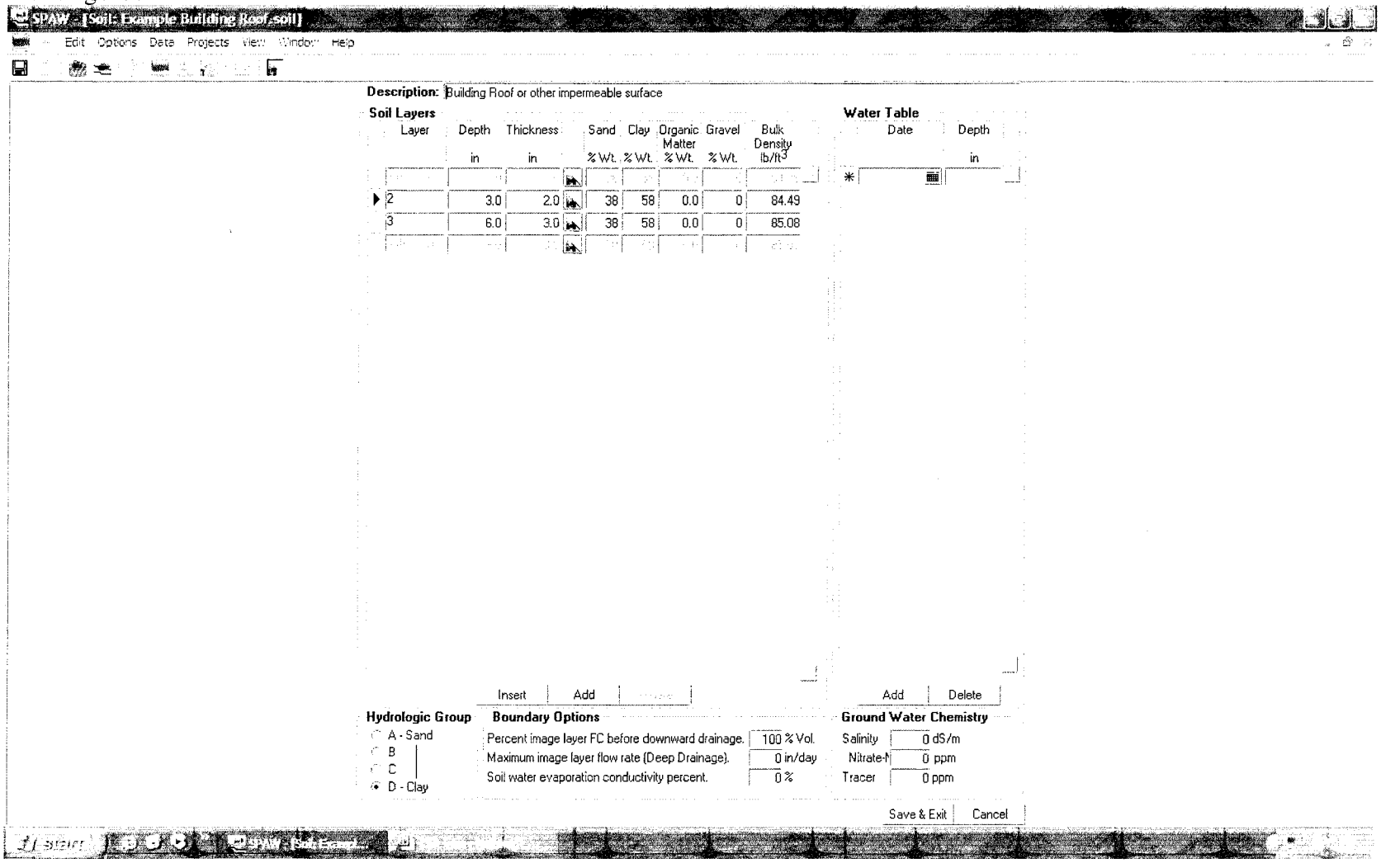
Greenbush Silt Loam



Sable Silt Loam



Building Roof



Tradition Dairy - Soils MSI Project No. 23807026 JLE 4-2-10

Tract	Acres, by Soil Type																		Acres in Tract
	Muscatine	Osco	Greenbush	Nasset	Sable	Rozetta	Elco	Paulsgrove	Dubuque	Senachawine	Frankville	Atterbury	Shullsberg	Stronghurst	Fayette	Dunbarton-Dubuque	Lawson	Massbach	
T120-6	65	62.1	17.4	3.9	5				0.2			3.1	8						164.8
T120-19	6.5		16.9	7.6					0.7										31.7
T1058-6,14		13.9	2.6	1.2								1.7							19.4
T1058-11,12	10.9	24.5		0.1	21.9				0.1										57.5
T1059-1.2		9.7	0.2																9.9
T1059-3,5,6,7,11,9	44.5	52.9	14.9	3.3		7.3		0.3	2										125.3
T1066-19	67.3	83.6	6		3.6														160.5
T1067-11,7	25	26.4			10.8								5.2						67.4
T4680-4						29.5								6					35.5
T4680-5,7,14						4.3	4.4			0.5				2.7					11.8
T4680-6,8,12						25.7	14.4	15.9	10.4					9.5	8.7	0.4			85
T4680-9						1		2.7	3.1										6.7
T4680-15,18						8.8			6	5.7					2.5				23
T5537-1,2,3,25,13	1	28	16.3	0.7		3.4		14.8	14.1						3.6		0.1		81.9
T5538-5,7,8,23,20	1.4		19.3	10.2			2.8	6.6	0.6		14.7	0.1					6		61.8
T5539-5		12.5	10.4															2.1	25
T5540-6	10.3	17.2	3																30.5
T5540.7	31.8	12.4	0.3																44.5
Totals	263.7	343.2	107.3	27.0	41.3	80.0	21.6	40.3	37.2	6.2	14.7	4.9	13.2	18.2	14.8	0.4	6.1	2.1	1042.2

Geologic Review
Tradition South Dairy
Jo Daviess County, Illinois

1.0 Introduction

This report is a summary of my review of geologic investigation data compiled for the Tradition South Dairy currently under construction in eastern Jo Daviess County. The facility is located in Section 6, Township 28 N, Range 5 East, south of Warren and west of Nora, Illinois.

I have been retained by attorneys for defendant AJ Bos to conduct this review. I am a registered professional engineer and registered professional geologist and hold such registrations in six states. I have had nearly 30 years of experience evaluating geologic and hydrogeologic conditions and have consulted on more than 100 projects. I hold three degrees: A Bachelor of Science in Geology and Bachelors Degree in Civil Engineering from the Ohio State University, and a Masters Degree in Environmental Engineering from the University of Wisconsin-Madison. A copy of my curriculum vitae is attached.

My conclusions are based on a review of the documents referenced in the attached bibliography as well as my personal observations made during an on-site inspection on December 29, 2008. The conclusions I render herein are based on my professional judgment and are all made to a reasonable degree of scientific certainty.

The proposed facility will include several barns and milking structures, stormwater runoff ponds, and three manure storage basins. The basins consist of two east-west trending 1200' × 400' in-ground structures (north and south), and one north-south trending 150' × 900' in-ground structure (west). Each basin is lined with two feet of compacted native clay. The basin construction includes a perimeter drain tile system to relieve groundwater pressure on the base of the clay liners during high water table conditions.[1] These tiles discharge to a ditch that flows south of the south property boundary. At the time of the site visit, construction of the storage basins had been discontinued.

2.0 Regional Setting

The dairy property is located between elevations 980 and 1,000 NGVD on a northeast-southwest trending ridge between two unnamed tributaries to the Apple River (the aforementioned ditch discharges to the southern tributary approximately one mile south of the property). Regional surface water flow is toward the southwest toward the Mississippi River, which forms the western boundary of the county approximately 25 miles to the west-southwest. The western portion of the county is within the southern extension of the Driftless Area, a geologic feature occupying much of southwestern Wisconsin bounding Jo Daviess County to the north. The origin of the Driftless Area name is based on the geologic history of the area that shows no evidence for continental glaciation, compared to the surrounding regions. The western part of the county is dissected by steep valleys and ridges not subject to erosion by historic ice

[1] The Natural Resources Conservation Service (NRCS) Conservation Practice Standard for Waste Storage Facilities (Code 313) states "The pond shall have a bottom elevation that is a minimum of 2 feet above the seasonal high water table unless features of special design are incorporated that address buoyant forces, pond seepage rate and non-encroachment of the water table by contaminants. The water table may be lowered by use of perimeter drains, if feasible, to meet this requirement."

movement. The dairy property near the eastern county line is at the proximity of the Driftless Area boundary. A regional location map showing the property boundary and surrounding topographic features is included as Figure 1.

3.0 Regional Geology

The overburden soils of Jo Daviess County are generally thin (10 - 50 feet thick) and are underlain predominantly by Ordovician bedrock units comprised of the Galena-Decorah-Platteville Formation. These units are comprised of younger dolomite (Galena) overlying older limestone/shales (Decorah) and still older limestone/dolomite (Platteville). Younger Silurian rocks are found overlying the Ordovician units in the south and west, and at the highest ridges throughout the county. Where Silurian bedrock is present, it is usually separated from the Ordovician units by Maquoketa Shale. However, Galena dolomite is often incorrectly classified as Silurian Niagara limestone on well driller logs because of the similarity in appearance between the two rock types. Figure 2 shows the location of two regional cross-sections in the vicinity of the proposed dairy developed from local well log data. Cross-section A-A' is oriented west-east and cross-section B-B' is oriented north-south. Each intersects at the proposed dairy site and is shown in detail on Figure 3.

The thin overburden results in numerous outcrops of the Galena Formation common throughout the county. Weathered Galena outcrops are found in road cuts and stream drainage ditches, and less weathered (often fresh) rock exposures are found in several quarries where the bedrock is extracted as construction material for aggregate, bedding and backfill. The dolomite is also quarried for use as decorative stone because of its bright yellowish-buff color.

The Driftless Area in southwest Wisconsin, southeast Minnesota, northeast Iowa and northwest Illinois is defined as a karst region. The Galena Formation is up to 200± feet thick in Jo Daviess County. Its carbonaceous composition as well as its proximity to the ground surface has caused karst features to form in the region. Karst features are typified by solution cavities, crevasses, caverns and caves, and are often reflected as sinkholes when covered with overburden at the surface. Solution cavities and crevasses are visible in many of the exposed rock faces in the county.

Karst formation is the result of percolating rainwater reacting with CO_2 in the atmosphere and soil to form a weak carbonic acid solution. This percolation reacts with the limestone and dolomites on the bedrock surface and along bedding planes. Dissolution occurs and over time flowpaths along the fractures enlarge. Underground drainage systems begin to develop, allowing greater flows to occur accelerating formation of subterranean karst features. The formation of this drainage system can lead to collapse structures at the surface visible as sinkholes.

An important consideration for karst formation is the relationship of the water table to the bedrock surface. The generally accepted karst formation process describes that solution features and caves are formed above the water table from downward and/or lateral percolation. This theory cites that the pattern of solution cavities/caves follows the same orientation as fractures in the bedrock. Additionally, subterranean flow found in these karst conditions can be traced to the

surface and emerge as seeps and streams. Because of this pattern, percolating water does not form solution cavities below the water table.

Alternatively, another theory states that karst formation occurs (1) during a period of dissolution below the water table, followed by (2) uplift and/draining, and further formation of caves and larger solution cavities above the water table. This theory cites that some known karst areas (e.g., central Florida) show a pattern of caves and solution cavities not oriented the same as the bedding planes and fractures in the rock (Spencer).

Observations made in Jo Daviess County on December 29, 2008 at both fresh quarry faces and along weathered exposed bedrock outcrops confirm that bedding planes in the Galena dolomite are horizontal. Visible fractures were observed parallel to and congruent with the bedding planes. Other fractures were observed perpendicular to these bedding planes. The formation of these vertical fractures may have been caused by a variety of forces (tectonic stresses and strains during deposition and rock formation, as well as expansion and contraction from freezing and thawing of the exposed rock faces). Several of these observed fractures were several inches wide and are properly classified as joints. These features were all observed above the water table as there was no evidence of obvious, continuous flow from any fractures. These observations indicate that formation of any large karst features in Jo Daviess County appears to be limited to the unsaturated zone.

4.0 Regional Hydrogeology

Based on regional data from private well logs (Table 1), the approximate location of the water table is shown at each well boring on the cross sections on Figure 3. The cross-sections show the water table generally within the Galena Formation, although the water table is shown within the overburden at the Fey and Williams wells near the proposed site. This water table configuration is considered approximate because the static water levels shown were reported by the drill crews at the time of well installation. Because these levels were taken at different times and years, the relationship of the water levels between wells is not precise. Regardless, a general understanding of regional water table and consequent flow conditions can be developed from these data. Figure 4 is a compilation of this information that shows the regional water table in the site vicinity.

The local well logs reviewed also include pumping information recorded at the time of well installation. Table 2 lists the geologic formation from which the groundwater was removed, pumping rate, the measured drawdown, and the calculated hydraulic conductivity (K) at each well. The collective average for K statistically representative of that portion of the regional aquifer (geometric mean) studied is 9.6×10^{-1} ft/day (3.4×10^{-4} cm/sec), as shown. The derived horizontal gradient from the developed water table configuration is 0.0286 ft/ft, which is a 20 foot change in water table elevation over a 700 foot distance. Assuming a fracture porosity of the dolomite of 0.5%[2], the groundwater flow velocity in the vicinity of the proposed dairy site is

[2] Research on groundwater flow in dolomite indicates that fracture porosity, rather than matrix porosity controls flow paths. The results of these studies propose an average fracture porosity of 0.5%. However, this research also shows that contaminant transport for recalcitrant (non-degrading) compounds is reduced by approximately 50% from matrix retardation (Parker).

5.5 ft/day. As shown on Figure 4, the site is located on a localized groundwater divide; flow is southeasterly at the southern portion of the site, and northwesterly at the northern portion. These flow conditions are largely because the site is located on a topographic "high". The configuration of the water table generally conforms to the slope of the ground surface.

5.0 Local Geologic Conditions

As described previously, the manure storage basins are located on the southern and western portions of the Tradition South Dairy site. The slope of the land surface is toward the south in the immediate area of the basins. Based on boring logs and construction information prepared as required for development, site specific geologic cross-sections were prepared for subsurface conditions in the immediate area of the basins (see Figures 5 and 6). These figures also provide an inset for the locations of the cross-sections. A-A' (Figure 5) trends northwest-southeast across the area; B-B' and C-C' (Figure 6) trend southwest-northeast and west-east, respectively. Each section includes information on the subsurface materials encountered where available, along with the bedrock elevations and bedrock depths and types where the bedrock was encountered and cored. The location of test pits and probe borings advanced during construction of the basins that include additional data regarding depths to bedrock are also shown. Superimposed on the cross sections are the elevations of the two-foot compacted clay liners for each basin. These sections show that the separation distance between the top of the liners and the bedrock is generally uniform. This separation thickens from the northwest corner of the existing north basin P17 to the southeast corner of the proposed south basin P-16, indicating a uniform southeast dip of the bedrock surface. These subsurface data confirm the nearest proximity of the bedrock surface to the compacted liner is at boring B-S18 at the northwest corner of the north basin. The top of the compacted liner at this point is 976 NGVD and the bedrock surface is at 971 NGVD, a separation of five feet. The greatest separation distance is at boring B-S15 at the southwest corner of the south basin. The top of the liner at this point is 971.5 NGVD; bedrock was not encountered at the maximum boring depth of 957 NGVD, a separation of 14.5 feet. These subsurface data also show that the compacted clay liners are also underlain by natural clays that range in depth from three to more than 12.5 feet.

The boring logs confirm that the overburden materials consist predominantly of silty clays, derived from wind-blown loess deposits as well as residuum from the carbonate bedrock. These clays are classified as CL according to the Unified Classification System, have low plasticity indices and have been used for construction of the compacted clay liners. At bedrock borings S-16 and S-18, drilled within the footprints of the south and north basins, respectively, the lean clay is underlain by fat clay (CH). This CH soil was correctly classified based on high liquid limit test results (above 50) on samples from the borings. Moist fat clays have low K values, approaching 1×10^{-8} cm/sec.

The logs for the bedrock borings (S-16, S-17 and S-18) indicate the dolomite is "weathered limestone". More detailed logs for angle borings S-17A and -17B confirm the local bedrock is dolomite (Galena) which corroborates the regional information shown on Figure 3. These detailed logs show that clay/shale interbeds were measured within the collected cores, which decrease with depth.

During the site inspection on December 29, 2008 the recovered bedrock cores were inspected and the rock quality designations (RQD) values determined for each core run. The RQD is a quantitative description of the rock quality from rock cores. It is defined as the percentage length of recovered core pieces greater than 4-inches divided by the total length of the core. This index is used widely within the mining and construction industries and provides a relative value for the degree of weathering. The following RQDs were derived for the cores inspected:

Boring (core run)	Depth of core(ft)	RQD (%)
S -16 [3]	20 – 36	26.2
S-17(1)	12.5 - 22	27.4
S-18(1)	20 – 30	29
S-18(2)	30 – 40	80
S-18(3)	40 - 46	95
S-17A(1) [4]	15.5 - 32	50.5
S-17A(2)	32 - 44	82.6
S-17B(1)	14.5 – 30	49.4
S-17B(2)	30 – 43.5	72.2

The detailed boring logs at S-17A and S-17B along with the RQD values above confirm that weathering of the bedrock at the proposed dairy site decreases significantly with depth, indicating less fracturing with depth and more competent bedrock.

6.0 Local Hydrogeologic Conditions

During drilling for the proposed development at the area of the manure storage basins, the water table was encountered within the overburden clays at approximately seven feet below the ground surface, or between 6 and 13 feet above the bedrock surface. The basin design anticipated these conditions and included the perimeter drain tile system mentioned in Section 1.0 of this report. Although wells were not installed during construction, the water level information shown on Figure 3 indicates this water table is part of the regional water table. It fluctuates seasonally based on precipitation, generally highest in the spring following the winter thaw and lowest in the late fall. Additionally, the site specific geologic cross-sections on Figures 5 and 6 show the water levels measured when first encountered during drilling (hollow blue symbols), as well as the static levels that were measured the following day prior to boring abandonment (solid blue symbols).[5] At each location where both levels were measured, there is an increase between the drilling levels and the static levels from 1.1 feet at B-S17 to 11.5 feet at B-S-12. B-S17 encountered several feet of weathered limestone beneath the overburden clays; B-S12 did not encounter bedrock within the overburden clays and silts. These observations indicate the

[3] Two separate core runs from 20 to 30 feet and 30 to 36 feet were logged at S-16; inspection of the cores did not identify the break between runs

[4] Logs for cores at S-17A and S-17B show 5 foot core runs; inspection of the logs identified the runs as shown above.

[5] Figures 5 and 6 also show the estimated maximum water table elevations based upon the depth of the perimeter drain system (solid turquoise symbols); the perimeter system is designed to reduce the water table below the liner.

overburden soil is a low permeability unit containing a saturated thickness, and is not an aquitard overlying a confined aquifer within the bedrock.

Observations during the site visit on December 29, 2008 further confirm this conclusion. The unnamed ditch crossing East Canyon Road south of the property was actively flowing at that time. Figure 3 shows the elevation of the ditch at this crossing between 940 and 950 NGVD; the static water level reported at the nearby Williams well located about 1000' feet to the west is 950 NGVD, within the overburden. Additionally, the sediments within the ditch immediately north of the crossing were probed during the site visit and the bedrock surface was encountered approximately 3½ feet below the water surface. The reach of the ditch was also inspected south of the boundary of the proposed dairy property to a point approximately 200 feet downgradient of the road crossing. Although accurate measurements were not made, no obvious losses in flow (diminished flows downgradient) were observed. These features would be expected if subterranean karst features were present in the underlying bedrock and the flows in the ditch were not a reflection of the regional water table.

7.0 Review of ISGS July 2009 Report

The Illinois State Geological Survey recently released a report (July 2009) demonstrating the use of light detection imaging and ranging (LIDAR), an aerial photo remote sensing technique, both county-wide and in the vicinity of the Tradition South Dairy site. This work was performed in an attempt to show the correlation between karst features (i.e, sinkholes, solution cavities) and linear fracture patterns (lineaments).[6] The report asserts that the LIDAR identified surface drainage patterns are "controlled by structures/crevices present in the underlying bedrock aquifer." One major lineament identified as the Apple River Canyon Lineament was mapped from to the eastern part of the county to the northwest for approximately 22 km and defined as a "...dominant solution enlarged crevice, a series similarly oriented crevices, or possibly a fault zone." The report asserts that several lineaments were mapped in the vicinity of the dairy site based on nearby surface drainage patterns and small sinkholes identified in the field. (The report stated that within the eastern part of the county, fewer sinkholes were identified by the LIDAR because their dimensions were below the resolution limits of the imagery.) The report depicts one of these lineaments trending northwest across the basin footprints.

The report described the use of ground penetrating radar (GPR) at sites within a few miles of the Tradition South Dairy site identifying anomalies measured within the near surface bedrock. This GPR evaluation was performed near an outcrop and quarry where crevices were observed that had earlier been attributed to localized fracturing of the bedrock because of quarrying and/or freeze thaw conditions. Anomalies identified from the GPR evaluation of the subsurface bedrock were described as potential individual fractures that were extensive within the bedrock mass. However, the report also indicated that the results were preliminary and inconclusive without further study.

[6] The definition of lineament as a geologic term is "a linear topographic feature of regional extent that is believed to reflect underlying crustal structure."

The report also presented a preliminary water table map in the area of the Tradition South Site developed from the intersection of topographic contours with nearby streams. The report indicated the limitations of the data to prepare the map, but is in general agreement with the regional water table map developed for this report shown on Figure 4. The report states that the mapped water levels show that the basin excavations encroach upon "groundwater flowing through the karst aquifer of the Galena limestone, especially if groundwater beneath Maquoketa shale is under pressure. This situation seems likely based on hydrogeologic observations; for example the stream that flows along the northwest corner of the Traditional South site is only one of two streams in this area that is perennial at elevations greater than 950 feet above msl. The reason for this may be that the stream is spring-fed. If that is the case, the water table would be confined and under artesian conditions."

Based upon the LIDAR mapping, GPR, and field observations in the regional vicinity, the report presented a conceptual site model for the karst aquifer within the Galena dolomite, as follows:

> "The aquifer possesses a relatively open karst system in the upper 15 to 25 feet with solution-enlarged crevices ranging from an inch to 3 or more feet wide and provides network (sic) of conduits and pathways through which groundwater can rapidly flow. Below 25 feet, many crevices become narrower and range from less than 0.25 inches to greater than an inch; east west trending crevices tend to retain their widths of 3 or more feet with depth thereby providing a (sic) large conduits for the karst aquifer network. Bedding planes are somewhat tighter features, but also provide pathways for groundwater movement."

The report concluded:

> "...that the Traditional (sic) South Dairy site and surrounding area overlie karstified carbonate bedrock that constitutes a karst aquifer. As such, the aquifer is highly susceptible to groundwater contamination."

The report further concluded:

> "Given that the thickness of the shale overlying the carbonate bedrock at the Traditional Dairy (sic) South site is only 10 to 20 feet thick, it is likely that the bottom of the waste lagoons will be resting on or within carbonate bedrock. Because lineaments are present on the site and because field evidence suggests that the lineaments are open crevices, it is likely that the waste lagoons will be in direct contact with a crevice or crevices that is/are part of the underlying karst aquifer. Consequently, if there were spills, leakage, or a catastrophic breach in the waste lagoon's containment system or their waste distribution system, the crevice-karst network would allow its contents to rapidly enter the aquifer and create widespread contamination of groundwater and surface water as well. Further given the environmentally sensitive nature of the Traditional South Site and surrounding areas, the application of animal waste onto nearby fields may also pose a threat to groundwater and surface water."

8.0 Geologic and Hydrogeologic Consequences on Site Development

Based on the foregoing, I conclude the following:

- The critical data required for any engineering design to be protective is the adequate characterization of the site specific geologic and hydrogeologic setting. Although regional information is useful, professional engineers do not design systems based on regional information. Site specific data must be utilized to understand actual conditions for design.

- The design and construction of the basins at the site include features fully protective of the local hydrogeologic conditions. This design has been prepared in compliance with the applicable regulations and engineering practice standards and has been permitted by the State of Illinois in accordance with those regulations.

- There is a very low potential for a threat to local groundwater resources from contaminant releases from the basins. Although the Driftless Area is a known karst area, and karst features have been observed in Jo Daviess County, the site specific geologic data derived during site development indicate no localized karst features are present below the basins.

- The near surface presence of the regional water table inhibits the formation of karst features in the immediate site vicinity. Additionally, the likely absence of local or site specific karst features prohibits rapid movement of contaminants via solution cavities.

- The groundwater flow information derived from local well data indicates that the advective flow velocity in the bedrock is conservatively estimated at 5± feet per day in the vicinity of the basins. However, potential contaminant transport in the fractured bedrock would be anticipated to be reduced because of retardation conditions in the rock matrix.

- Potential bacterial contamination that may reach groundwater cannot migrate significantly at these velocities, and will not survive in the low oxygen groundwater environment. Although there is greater potential for inorganic contaminants to migrate within the groundwater, any contaminant will be attenuated with normal seepage through the compacted clay liners and natural clay overburden.

- The native thick clay overburden underlying the basins minimizes the quantity of seepage that will normally occur from the impounded effluent (application of Darcy's law shows the maximum seepage through the five feet of clay at the northwest corner of the north basin (worst-case locations) is less than 370 gal/acre/day; this assumes an average K of 1 $\times 10^{-7}$ cm/sec and effluent depth of 15 feet). The total actual seepage from the basins will be significantly less because natural deposits of fat clays classified CH underlie the basins. Additionally, the majority of the basin area is underlain by a clay thickness

greater than five feet further reducing the quantity of seepage. Furthermore, precipitated solids from the effluent will lower the permeability of the compacted liner.

- Although the natural water table levels in the area of the basins likely fluctuate based on seasonal conditions, the low permeabilities in the overburden soils will prevent a rapid water table rise; these soil conditions negate the potential for hydrostatic uplift, scour and piping at the base of the liners. Additionally, the perimeter drain system included in the final basin design will eliminate a water table rise above the base of the liners.

- The greatest thickness of overburden removed for construction was in the northwest corner of the north basin at boring B-S18, where approximately 17 feet was excavated. The two-foot thick recompacted clay liner was then installed. Assuming a natural unit weight of the overburden soils of 130 lbs/ft^3, this results in a pressure reduction on the excavated surface at this point of approximately (2,200) lbs/ft^2. However, the added load imposed by the compacted clay liner along with 15 feet of effluent (assuming 135 lbs/ft^3 for the unit weight of the compacted clay and 62.4 lbs/ft^3 for the unit weight of effluent) results in a net pressure reduction of approximately (1,000) lbs/ft^2 on the excavated surface. The smallest thickness of overburden proposed for removal is at the southeast corner of the south basin, where approximately two feet of overburden will be removed for installation of the clay liner. Using the same unit weights described above, this will result in a net pressure increase on the excavated soil surface at this point of approximately 950 lbs/ft^2. These are extremely low foundation pressures, and will result in imperceptible total and differential settlement/heave across the basins. Additionally, because of the elastic nature of the underlying natural clays, the net pressure change within a few feet of the excavated surface is reduced to zero. Consequently, the potential for basin subsidence is negligible.

- The July 2009 ISGS report describes the use of sophisticated remote sensing techniques and applies those results in an attempt to reach site specific conclusions. This is not an accepted standard of practice in the geotechnical engineering industry. The data discussed in the ISGS report are general in nature and not determinative of site conditions. Actual site subsurface data is more reliable and is always applied in accordance with standard engineering practice. Site specific subsurface data must be collected prior to the design of any structure that may affect or be affected by soil or groundwater conditions. For developments such as the Tradition South Dairy, the data collection process is promulgated through a specific set of regulations, which were followed, reviewed and permitted by the State of Illinois. Several of the ISGS report conclusions do not consider the site-specific soil and groundwater data collected to date and are incorrect (i.e., the basins are/will not be in direct contact with the bedrock surface, nor is there evidence of a confined aquifer in the dolomite in the site vicinity). Although the data in the ISGS report provide useful regional information, it is inappropriate to apply these data as a platform to interpret site-specific conditions.

In summary, this evaluation confirms that the proposed basins do not present a significant threat to the groundwater resources of eastern Jo Daviess County.

Geologic Review
Tradition South Dairy
Jo Daviess County, Illinois

Submitted by

David P. Trainor

David P. Trainor, P.E., P.G.
August 12, 2009

Attachments

References
Curriculum Vitae

Figure 1 – Site Location
Figure 2 – Regional Overview Map
Figure 3 – Regional Cross Sections
Figure 4 – Regional Groundwater Elevations Map
Figure 5 – Detailed Geologic Cross Section A-A'
Figure 6 – Detailed Geologic Cross Sections B-B' and C'C'

Table 1 - Water Level Data from Local Private Wells
Table 2 - Summary of Hydraulic Parameters Derived from Well Drillers Logs

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NEWFIELDS

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Partner

EXPERIENCE SUMMARY

Mr. Trainor has nearly 30 years experience in numerous environmental projects and investigations, which include both federal (NPL, RCRA and removal action programs) and state-lead projects. Categories include disposal facility siting and design studies, RI/FS programs, groundwater assessments, remedial design, and construction management. He has represented industrial and government clients in technical negotiations for a variety of facilities and settings.

REGISTRATIONS AND PROFESSIONAL AFFILIATIONS

Professional Engineer, Wisconsin, Michigan, Pennsylvania, California, Idaho, Iowa
Professional Geologist, Wisconsin
American Society of Civil Engineers
International Society for Soil Mechanics and Foundation Engineering
American Institute of Professional Geologists, Certified Professional Geologist, AIPG

EDUCATION AND TRAINING

M.S. Civil and Environmental Engineering, University of Wisconsin, Madison, 1983
B.S. Civil Engineering, Ohio State University, 1978
B.S. Geology, Ohio State University, 1975
OSHA 40-hour Hazwoper

PROFESSIONAL HISTORY

NewFields, 2003 to present
URS Corporation (previously Dames & Moore), Principal-in-Charge/Senior Engineer, 1987 to 2003
RMT, Inc., Geotechnical Project Engineer, 1983 to 1984; 1985 to 1987
Northern Engineering and Testing, Geotechnical Project Engineer, 1984 to 1985
Terratech, Inc., Staff Engineer, 1978 to 1981

REPRESENTATIVE PROJECT EXPERIENCE

- Currently managing multi-firm RI/FS at a former ordnance manufacturing facility, NPL site; administered as a wildlife refuge by the federal Fish and Wildlife Service; Marion, Illinois.
- Managed RI/FS for NPL site, former manufactured gas plant and wood treatment site; directed remedial design and construction for interim coal tar removal system from a confined aquifer; Ashland, Wisconsin.
- Refurbished defunct groundwater extraction and pumping system; developed ozone sparge system design for low permeability soil conditions contaminated with chlorinated hydrocarbons at a former manufacturing plant. Edgerton, Wisconsin.
- Evaluated mercury migration conditions in groundwater in defense of class-action claim at a caustic soda manufacturing facility; McIntosh, Alabama.
- Oversaw USEPA removal action; negotiated groundwater cleanup costs for final settlement with Wisconsin Department of Natural Resources for a former plating facility; Elkhorn, Wisconsin.
- Developed source and groundwater characterization data for an historic industrial site contaminated with chlorinated hydrocarbons; developed in-situ and ex-situ remedial options for soil contaminated as hazardous waste; Fort Atkinson, Wisconsin

- Coordinated investigation and developed remedial options for a former manufactured gas plant site currently used as a bulk propane distribution facility. Marshfield, Wisconsin.
- Performed research and provided expert testimony about the fate and transport of gasoline contaminants released from underground storage tanks allegedly contaminating a private residence. Wisconsin.
- Coordinated and implemented environmental due diligence in preparation for acquisition for poultry processing operations at 90+ facilities. Wisconsin and Minnesota.
- Provided expert testimony at an arbitration hearing on the validity of long-term remedial costs for a landfill (Superfund site) in southeastern Wisconsin.
- Developed remedial options for several manufactured gas plant sites; New York and Pennsylvania.
- Coordinates groundwater extraction/treatment and monitoring at a plating facility site contaminating groundwater with chromium. Illinois.
- Evaluated applicability of past and future costs to validate insurance claims for remedial action at several landfill sites, Great Lakes States.
- Provided research and expert testimony at deposition for a named party at a Superfund site identifying other PRPs from individual waste stream analyses, Wisconsin.
- Directed ROD implemented remedy including a gas extraction system upgrade and point-of-entry water filter installations for private homes, municipal sanitary landfill; Hudson, Wisconsin. Included expert testimony at trail.
- Directed work plan development, negotiated USEPA approval, and directed the investigation for an abandoned landfill (NPL site); Tomah, Wisconsin.
- Oversaw design and construction of a landfill gas extraction system for an abandoned sanitary landfill; Tomah, Wisconsin.
- Provided expert testimony at deposition for a machine parts manufacturer evaluating the identification of manufactured gas plant waste disposed on their property; Milwaukee, Wisconsin.
- Provided expert testimony at trial for a paper company providing alternative water supplies for private residences affected by groundwater contamination from an industrial landfill; Eau Claire, Wisconsin.
- Developed strategy for investigating and providing cleanup options for dry-cleaning sites; Stevens Point, Wisconsin.
- Provided Agency negotiation, consultant review and oversight of an investigation and remedial options analysis for an abandoned sanitary landfill; Rice Lake, Wisconsin.
- Directed remedial design and remedial action oversight including final cover and landfill gas control, for an abandoned municipal waste landfill; Wausau, Wisconsin.
- Directed remedial design activities, including final cover and landfill gas control, for an abandoned municipal waste landfill; Rhinelander, Wisconsin.
- Performed a groundwater assessment, negotiated Agency approval for a selected remedial option, and directed construction management of a leachate extraction system for a paper waste landfill; Eau Claire, Wisconsin.
- Directed preparation of design plans and specifications, and construction management for remediation of 200,000 cubic yards of mining wastes under the Wisconsin Environmental Repair Program; Mineral Point, Wisconsin.
- Provided expert testimony at trial for food processing company siting a solid waste disposal facility; case involved potential groundwater contamination from biological residues originating from waste land-spreading.
- Provided expert testimony at deposition for a defendant for insurance claims at a foundry waste site (contaminated with lead); Milwaukee, Wisconsin.

- Prepared and implemented USEPA-approved RCRA facility investigation work plan for a hazardous waste incinerator (CWM Chemical Services); Chicago, Illinois.
- Directed preparation of Plan of Operation for a 3.5 million cubic yard sanitary landfill, including expert testimony before the Waste Facility Siting Board; Madison, Wisconsin.
- Directed preparation of plans and specifications for landfill cover restoration, state Superfund site; Madison, Wisconsin.
- Directed a remedial investigation and feasibility study for groundwater remediation options for an abandoned landfill; Dane County, Wisconsin.
- Directed remedial investigation for a former wood treatment (creosote) facility; Reed City, Michigan.
- Negotiated language for a voluntary consent order and directed investigation for a landfill remedial investigation (PRP group); Madison, Wisconsin.
- Coordinated design and construction of a landfill gas extraction system; Madison, Wisconsin.
- Directed preparation of a Feasibility Study and hydrogeologic assessment for a 1.5 million cubic yard industrial landfill; Wisconsin.
- Coordinated investigations and developed remediation options for several abandoned city sanitary landfills; Madison, Wisconsin.
- Developed a Feasibility Study for a 4 million cubic yard sanitary landfill, and provided expert testimony at a contested-case hearing; Madison, Wisconsin.
- Supervised subsurface investigations and prepared recommendations for remediation of two chlorinated hydrocarbon spill sites; Wisconsin manufacturing facilities.
- Supervised subsurface investigations and prepared hydrogeologic reports for several closed municipal landfill sites; Madison, Wisconsin.
- Prepared RCRA facility investigation work plan for a large military defense contractor (Hamilton Standards); Windsor Locks, Connecticut.
- Developed remediation options for PCB-contaminated soils at an aluminum manufacturing plant; Kentucky.
- Developed an environmental and economic assessment for a county siting a hazardous waste facility; Minnesota.
- Prepared feasibility/plan of operation report for a PCB transformer salvage facility; Juneau, Wisconsin.
- Designed a vacuum extraction system for remediation of an underground gasoline spill at a service station; Madison, Wisconsin.
- Designed and supervised construction of clay-lined earthen impoundments with dewatering facilities for foundry process sludge for a large industrial foundry facility; Defiance, Ohio.
- Devised geotechnical testing programs of various waste materials generated from paper manufacturing processes.
- Provided geotechnical analysis and recommendations for repair of a failure in a clay liner sidewall for a sanitary landfill; Minneapolis.
- Designed and implemented a modified multi-unit triaxial device to study the effects of leachate permeants on clay soils.
- Designed and provided construction documentation, kiln dust disposal facility; Alpena, Michigan.
- Designed and provided construction documentation, sanitary landfill; Minneapolis.
- Designed and provided construction documentation, foundry waste landfill; Milwaukee.
- Performed hydrogeological assessment of a solvent spill for an underground storage tank; South Bend, Indiana.

- Determined stability and projected settlements of embankments for bridge foundation; Idaho.
- Designed foundation and retaining structure recommendations for various commercial, industrial and transportation facilities; Idaho, Oregon and Washington.
- Designed foundation systems for residential, commercial and industrial buildings constructed on problem soils; San Francisco Bay area.
- Developed recommendations for the repair of residential structures damaged by soil expansion and settlement; San Francisco Bay area.
- Analyzed static and dynamic seacliff erosion and provided setback recommendations for a coastal development; Aptos, California.

PUBLICATIONS AND PRESENTATIONS

Author, "The Results of Treating MGP Generated Tar with an Innovative In-Situ Chemical Oxidation Technology at a former MGP Site in Northern Wisconsin," Remtech09 Conference, 2009

Author, "Strengths of GIS Application on Site Characterization," American Gas Association – MGP Workshop, 2006.

Author, "Characterization and Remedial Action at a Former MGP Adjacent to a Former Wood Treatment Operation," Gas Technology Institute Site Remediation Technologies Conference, 2000.

Co-author, "Isotopic Identification of the source of Methane in Subsurface Sediments of an Area Surrounded by Waste Disposal Facilities," in Applied Geochemistry, USGS, 1998.

Co-author, "Groundwater Remediation at a DeInk Landfill," TAPPI Environmental Conference, 1994.

Author, "Isotope Aging to Determine Methane Gas Sources, Geological Society of America, National Conference, 1992.

Author, "Current Status of Environmental Assessments," Government Institutes Seminar, Madison, 1992.

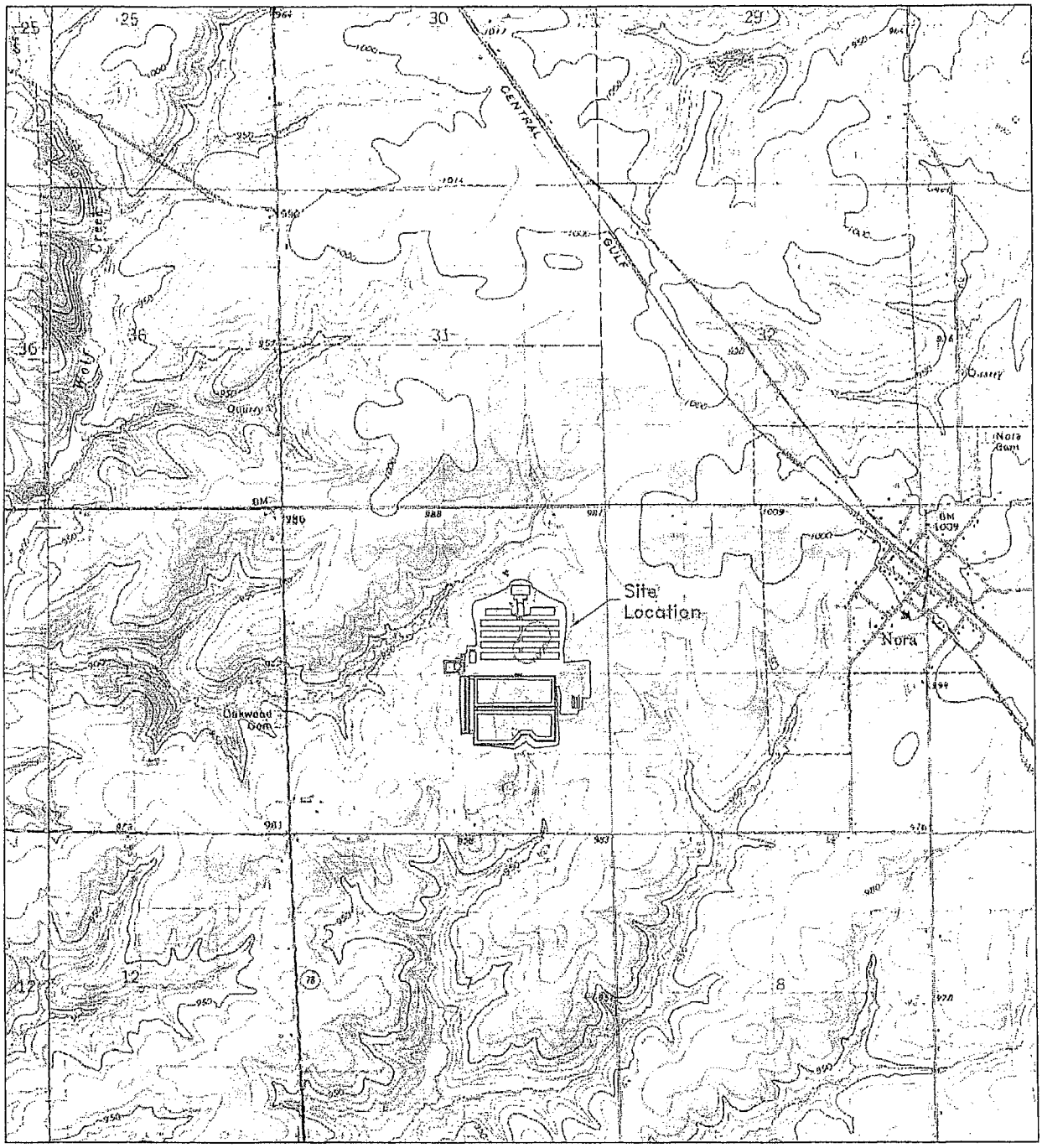
Author, "RCRA Corrective Action – 1990," paper presented to the Minnesota State Bar Association, Minneapolis, 1990.

Author, "Investigation and Remediation of a Printing Solvent Release," paper presented at the short course Detection and Corrective Action for Leaking Underground Storage Tanks, Department of Engineering-Professional Development, University of Wisconsin, Madison, 1989.

Co-author, "Case Studies in Constructive Use of Foundry Wastes for Landfill Construction," paper presented at the American Foundrymen's Society Casting Conference, 1987.

Author, "Moisture and Saturation Effects on Hydraulic Conductivity Testing," paper presented at the ninth annual Madison Waste Conference, 1986.

Co-author, "Use of Foundry Quenched Slag - Drainage Medium," presented at the 1986 Madison Waste Conference.



BASE MAP SOURCE: USGS 7.5 MINUTE TOPOGRAPHIC QUADRANGLE, WARREN, ILLINOIS.

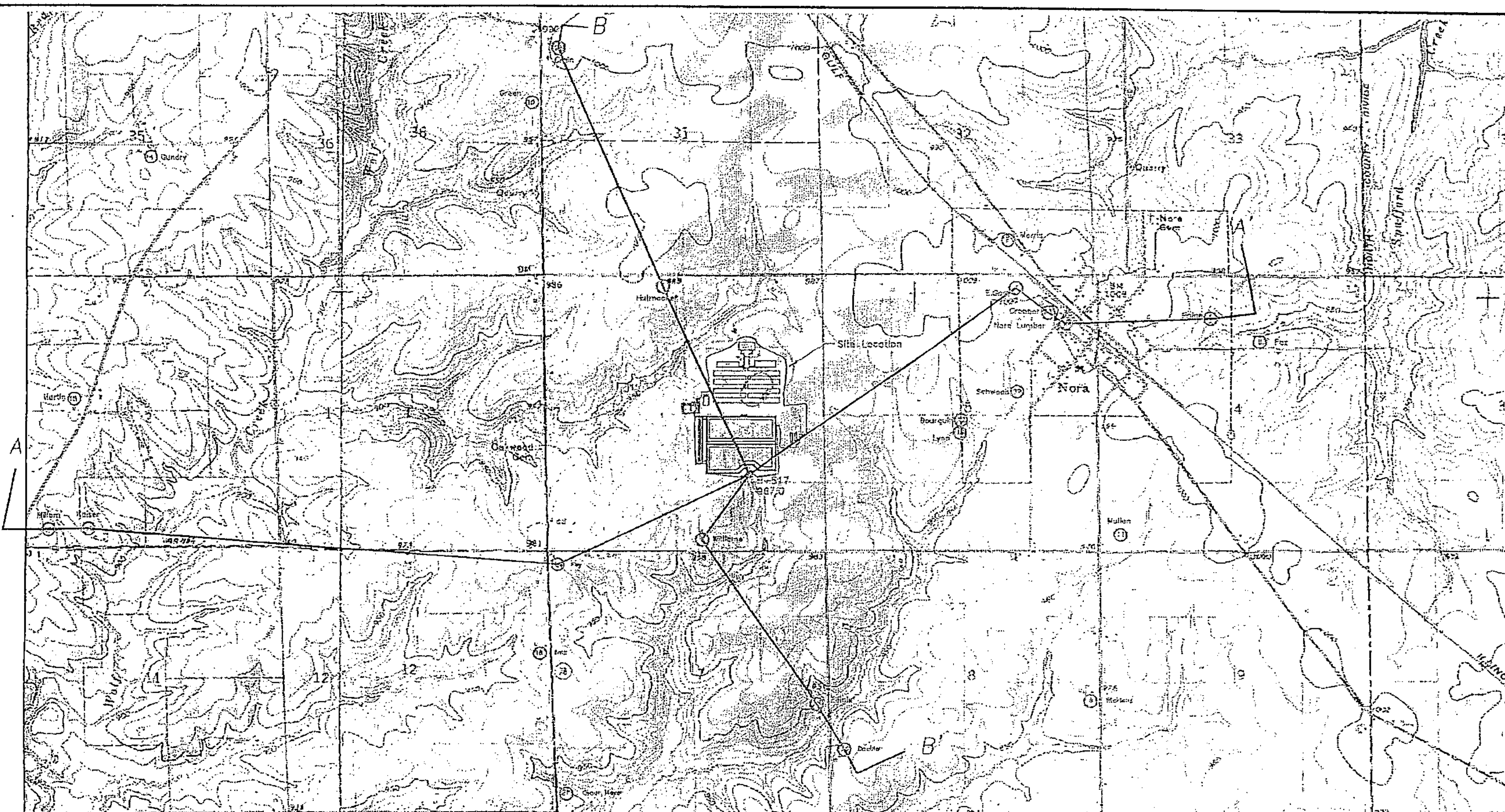
NORTH
SCALE: 1"=2400'

TITLE:	FIGURE 1 SITE LOCATION
PROJECT:	TRADITION SOUTH DIARY NORA, ILLINOIS
DRAWN BY: DDZ	DATE: 30.JULY.2009 PROJECT# 1490-001-800
CHECKED BY: DPT	DOCUMENT: Figure 1, Site Location Map
APPROVED BY: DPT	

NEWFIELDS
2110 LUANN LANE, SUITE 101
MADISON, WI 53713
(608) 442-5223

FIGURE 1

PRIVILEGED AND CONFIDENTIAL: ATTORNEY–CLIENT WORK PRODUCT



LEGEND

Private Well Location

0 2000 4000

APPROX. SCALE: 1''=2000'

PRIVILEGED AND CONFIDENTIAL:
ATTORNEY–CLIENT WORK PRODUCT

TITLE:

REGIONAL OVERVIEW MAP
(Cross Sections)

PROJECT:

TRADITION SOUTH DIARY
NORA, ILLINOIS

DRAWN BY: DDZ	DATE: 30JULY2009	PROJECT# 1490-001-800
CHECKED BY: DPT	DOCUMENT: Figure 2, Regional overview	
APPROVED BY: DPT	FILE: c:\projects\AJBos\Cadfiles\XsectionsREV.dwg	

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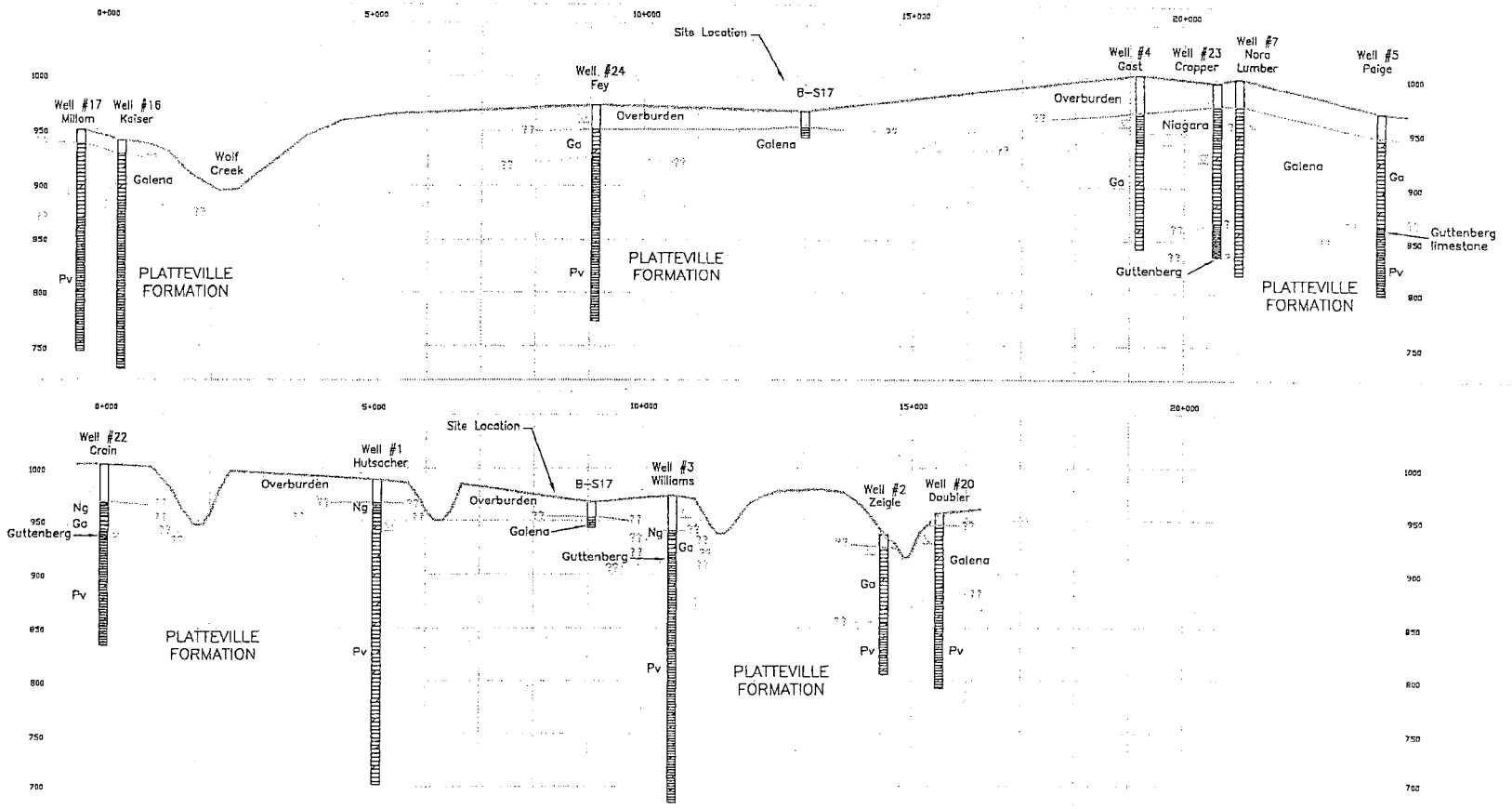
FIGURE
2



Notes:
Guttenberg Limestone is a member of the Decorah formation, lying between the Galena and Platteville formations.

Water table elevations are approximate. Static water levels determined following well installation based on well driller's logs.

PRIVILEGED AND CONFIDENTIAL:
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LEGEND (CROSS-SECTION VIEW)

- Limestone (Niagara Formation)
- Dolomite (Galena Formation)
- Limestone/Shale (Guttenberg member of the Decorah formation)
- Limestone/Dolomite (Platteville Formation)
- GROUND SURFACE (Simplified)
- BEDROCK SURFACE (Simplified, dashed where inferred)
- FORMATION CONTACT (Approximate, dashed where inferred)
- Approximate static water level (as recorded on boring logs)

HORIZONTAL SCALE: 1" = 2000'
VERTICAL SCALE: 1" = 100'
VERTICAL EXAGGERATION = 20X

TITLE:
REGIONAL CROSS SECTIONS
A-A' (West to East) & B-B' (North to South)

PROJECT:
TRADITION SOUTH DIARY
NORA, ILLINOIS

DRAWN BY: DDZ	DATE: 30.JULY.2009 PROJECT# 1490-001-800
CHECKED BY: DPT	DOCUMENT: Figure 3, Regional cross sections
APPROVED BY: DPT	FILE: c:\projects\AJBos\Cadfiles\RegionalXsections.dwg

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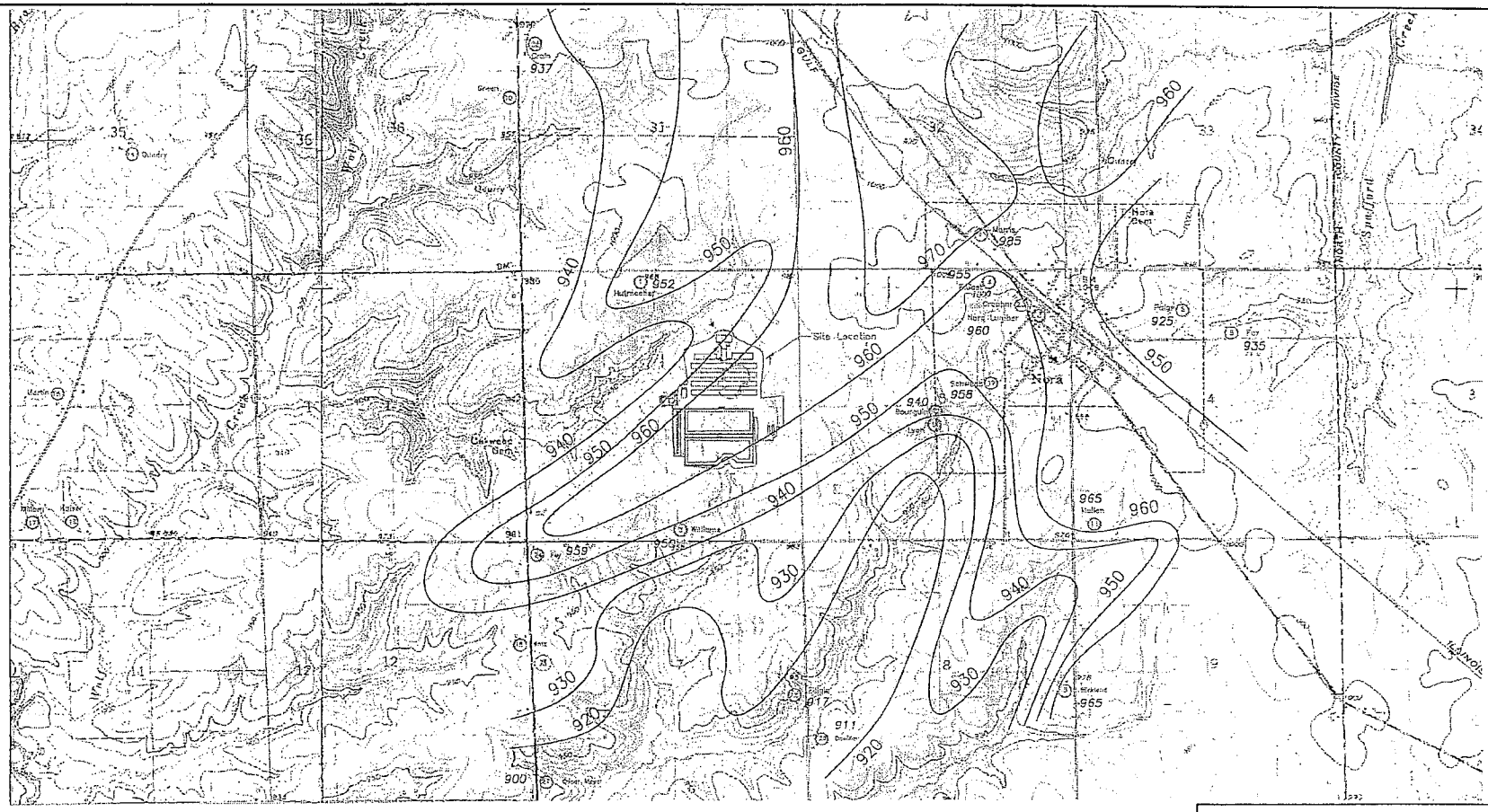
FIGURE
3



LEGEND

① Hutmacher	Private Well Location
———	Groundwater Elevation contour (feet)
955	Groundwater Elevation (approximate)

0 2000 4000

APPROX. SCALE: 1"=2000'

PRIVILEGED AND CONFIDENTIAL:
ATTORNEY–CLIENT WORK PRODUCT

TITLE:
REGIONAL GROUNDWATER ELEVATIONS MAP

PROJECT:
TRADITION SOUTH DIARY
NORA, ILLINOIS

DRAWN BY: DDZ	DATE: 30 JULY 2009	PROJECT# 1450-001-800
CHECKED BY: DPT	DOCUMENT: Figure 4, GW Elevations map	
APPROVED BY: DPT	FILE: c:\projects\AJBos\Cadfiles\GWelevations.dwg	

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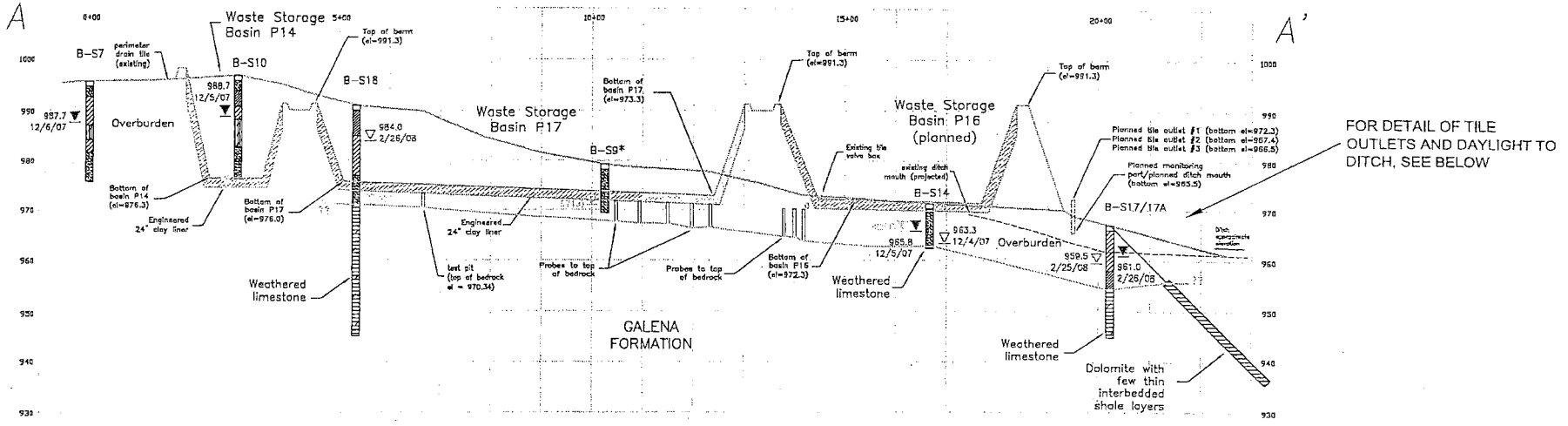
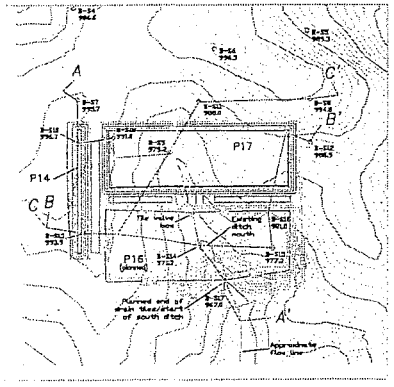
FIGURE
4



LEGEND

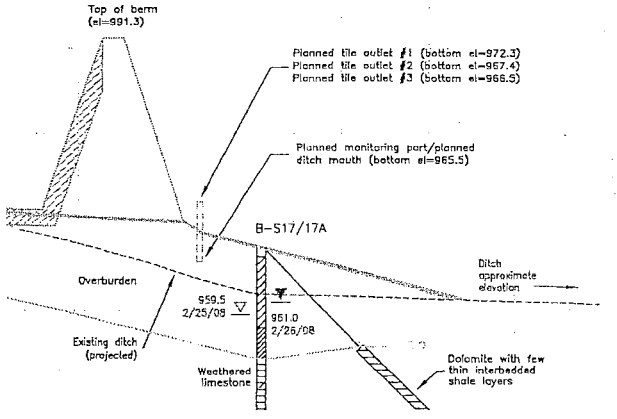
- TOPSOIL
- LEAN CLAY (CL)
- LEAN TO FAT CLAY (CL/CH)
- CLAYEY SAND (SC)
- CLAYEY SILT (MU/CL)
- FAT CLAY (CH)
- LIMESTONE BEDROCK
- ORIGINAL GROUND SURFACE (SIMPLIFIED)
- BEDROCK SURFACE (SIMPLIFIED)
- WATER LEVEL ENCOUNTERED WHILE DRILLING (WITH DATE SHOWN)
- WATER LEVEL MEASURED DAY AFTER DRILLING (WITH DATE SHOWN)
- ESTIMATED WATER LEVEL AFTER INSTALLATION OF PERIMETER DRAIN TILE
- WATER NOT ENCOUNTERED
- PERIMETER DRAIN TILE (EXISTING)
- PERIMETER DRAIN TILE (PLANNED)
- TEST PIT (ADVANCED DURING BASIN CONSTRUCTION)
- BEDROCK SOIL PROBE (ADVANCED DURING CONSTRUCTION)

OVERVIEW MAP



HORIZONTAL SCALE: 1" = 200'
VERTICAL SCALE: 1" = 20'
VERTICAL EXAGGERATION = 10X

DETAIL OF PLANNED TILE OUTLETS AND DAYLIGHT TO DITCH



NOTES:
BASINS P14 & P17 HAVE BEEN PARTIALLY CONSTRUCTED, BASIN P16 HAS NOT YET BEEN CONSTRUCTED.

DRAIN TILE SYSTEM HAS BEEN CONSTRUCTED AROUND BASINS P14 & P17 AND DOWN THE CENTER AND AROUND THE PERIMETER OF ALL PLANNED BASINS. DRAIN TILES ARE NOT INSTALLED AROUND SOUTH END OF PLANNED BASIN P16.

PRIVILEGED AND CONFIDENTIAL:
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TITLE:
DETAILED GEOLOGIC CROSS SECTION
A-A' (North to South)

PROJECT:
TRADITION SOUTH DIARY
NORA, ILLINOIS

DRAWN BY: DDZ	DATE: 7.AUG.2009	PROJECT# 1490-001-800
CHECKED BY: DPT	DOCUMENT: Figure 5, Detailed X Sections	
APPROVED BY: DPT	FILE: c:\projects\AUBost\Cadfiles\XsectionsREV.dwg	

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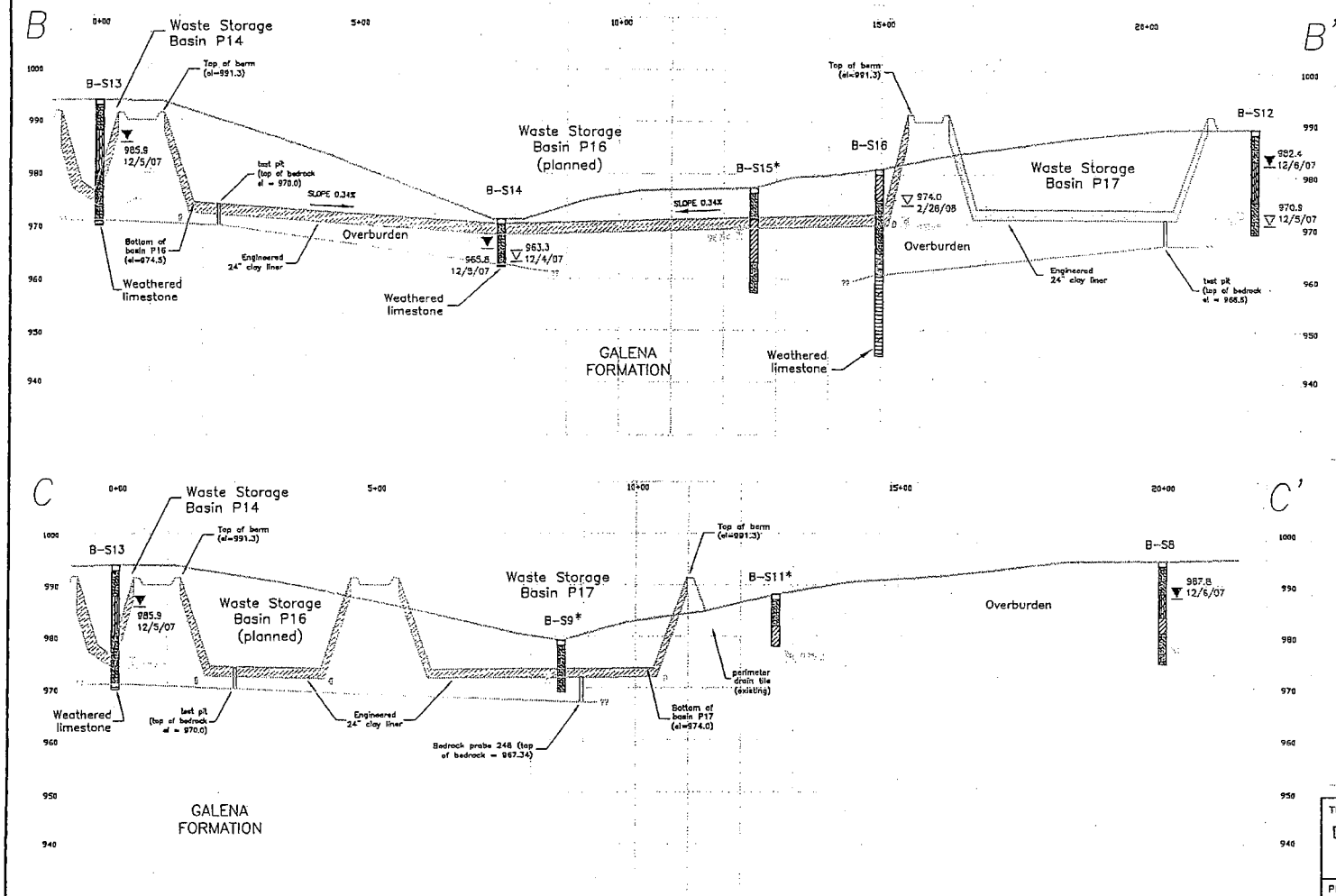
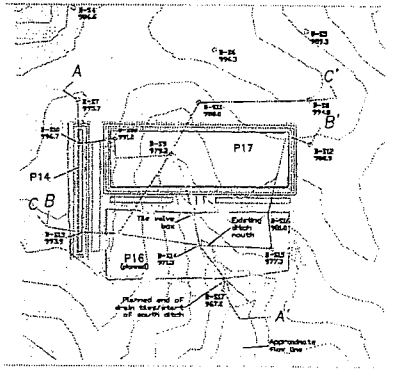
FIGURE 5



LEGEND

- TOPSOIL
- LEAN CLAY (CL)
- LEAN TO FAT CLAY (CL/CH)
- CLAYEY SAND (SC)
- CLAYEY SILT (ML/CL)
- FAT CLAY (CH)
- LIMESTONE BEDROCK
- ORIGINAL GROUND SURFACE (SIMPLIFIED)
- BEDROCK SURFACE (SIMPLIFIED)
- WATER LEVEL ENCOUNTERED WHILE DRILLING (WITH DATE SHOWN)
- WATER LEVEL MEASURED DAY AFTER DRILLING (WITH DATE SHOWN)
- ESTIMATED WATER LEVEL AFTER INSTALLATION OF PERIMETER DRAIN TILE
- WATER NOT ENCOUNTERED
- PERIMETER DRAIN TILE (EXISTING)
- PERIMETER DRAIN TILE (PLANNED)
- TEST PIT (ADVANCED DURING BASIN CONSTRUCTION)
- BEDROCK SOIL PROBE (ADVANCED DURING BASIN CONSTRUCTION)

OVERVIEW MAP



NOTES:
BASINS P14 & P17 HAVE BEEN PARTIALLY CONSTRUCTED, BASIN P16 HAS NOT YET BEEN CONSTRUCTED.

DRAIN TILE SYSTEM HAS BEEN CONSTRUCTED AROUND BASINS P14 & P17 AND DOWN THE CENTER AND AROUND THE PERIMETER OF ALL PLANNED BASINS. DRAIN TILES ARE NOT INSTALLED AROUND SOUTH END OF BASIN P16.

HORIZONTAL SCALE: 1" = 200'
VERTICAL SCALE: 1" = 20'
VERTICAL EXAGGERATION = 10X

PRIVILEGED AND CONFIDENTIAL:
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TITLE:
DETAILED GEOLOGIC CROSS SECTIONS B-B' (West to East) & C-C' (SW to NE)

PROJECT:
TRADITION SOUTH DIARY
NORA, ILLINOIS

DRAWN BY: DDZ	DATE: 7.AUG.2008	PROJECT# 1490-001-800
CHECKED BY: DPT	DOCUMENT: Figure 6, Detailed X Sections	
APPROVED BY: DPT	FILE: c:\projects\AJBos\Cadfiles\XsectionsREV.dwg	

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FIGURE 6

Table 1
Water Level Data from Local Private Wells

Location Number	Well Loaction/Owner	Approximate Ground Surface Elevation	Static Water Level	Approximate Groundwater Elevation
1	Hutsmacher	990	50	940
1	Hutsmacher	990	38	952
2	Williams/Ziegle	935	25	910
2	G Williams/Ziegle	935	18	917
3	Williams	975	25	950
4	Gast	1005	49	956
4	Gast	1005	50	955
5	Paige	970	45	925
5	Paige	970	43	927
6	Fox	965	30	935
7	Nora Lumber	1005	45	960
8	Wickland	975	10	965
9	Morris	1000	15	985
10	Green	975	9	966
11	Mullen	980	15	965
11	Mullen	980	20	960
12	Bourguin	970	30	940
13	E Lyon	970	70	900
14	Gundry	960	35	925
15	Martin			
16	Kaiser	940	46	894
17	Millam	950	58	892
18	Hintz	965	66	899
19	Schwoob	975	17	958
20	Doubler	940	29	911
21	Oscar Meyer	955	55	900
22	Crain	1005	68	937
23	Cropper	995	72	923
24	Fay	975	16	959

Table 2
Summary of Hydraulic Parameters Derived from Well Drillers Logs

ec	API (click for report)	Longitude (NAD83)	Latitude (NAD83)	Sec	Twp	Dir	Rng	Dir	Owner Name	Driller	Elev (Ft)	Elev Ref	Total Depth	Casing Depth	Formation	Top Elev	Bottom Elev	Rate (gpm)	Static Water (ft bgs)	Water Level while pumping (ft bgs)	Drawdown (ft.)	Specific Capacity (gpm/ft)	Transmissivity (gpd/ft)	Saturated Thickness (ft.)	Hydraulic Conductivity (gpd/ft^2)	Hydraulic Conductivity (ft/day)	Hydraulic Conductivity (cm/sec)
1				6	28	N	5	E	Hutsmacher, Landis	Geo. Lyons	0		288	26	Platteville	31	288	30	50	64	14	2.14	3,214.3	238	13.51	1.81	6.37E-04
2		-89.964956	42.436221	7	28	N	5	E	Zeigle, L.R.	Coad Well & Pump Co.			125	80	Galena	76	125	20	16	63	47	0.43	638.3	109	5.86	0.78	2.76E-04
2.5				7	28	N	5	E	Williams, George/Kenneth	Lyons Well Drilling			130	42	Galena	63	125	26	29	72	43	0.60	907.0	96	9.45	1.27	4.46E-04
3				6	28	N	5	E	Williams, Gerald	Larry Lyons			291	197.5	Platteville	63	291	30	25	110	80	0.38	562.5	266	2.11	0.28	9.98E-05
4	1.2025E+11	-89.961302	42.456484	5	28	N	5	E	Gas, Emil/Gast	Dale Hubb	0		162	41	Galena	65	162	25	50	110	60	0.42	625.0	112	5.58	0.75	2.63E-04
5				4	28	N	5	E	Paige, Bill	Lyons Well Drilling			170	41	Platteville	110	170	12	45	60	15	0.80	1,200.0	125	9.60	1.29	4.53E-04
6				4	28	N	5	E	Fox, Robert	Lyons Well Drilling			179	43	Platteville		170	10	30	120	90	0.11	166.7	140	1.19	0.16	5.62E-05
7	1.2065E+11	-89.947807	42.456742	5	28	N	5	E	Nora Lumber Company	owner	1000	TM	182	31	gray limestone	82	182	10	45	47	2	5.00	7,500.0	137	54.74	7.34	2.58E-03
8	1.2065E+11	-89.946022	42.434327	8	28	N	5	E	Wickland, Emma	owner	970	TM	135	22	limestone	0	135	12	10	40	30	0.40	600.0	125	4.80	0.64	2.27E-04
9	1.2025E+11	-89.953701	42.462669	32	29	N	5	E	Morris, Clarence	Coad, Floyd M.	0		177	40	Galena	81	177	15	16	68	52	0.29	432.7	161	2.69	0.36	1.27E-04
10	1.2065E+11	-89.985854	42.46625	36	29	N	4	E	Green, Joe	owner	0		142	104	Galena	70	142	25	10	70	60	0.42	625.0	132	4.73	0.63	2.23E-04
11	1.2025E+11	-89.943737	42.445336	4	28	N	5	E	Mullen, Mark	Coad, Floyd M.	0		165	40	Galena	32	165	15	21	48	27	0.56	833.3	144	5.79	0.78	2.73E-04
12	1.2065E+11	-89.954976	42.451844	5	28	N	5	E	Bourguin, Tom	owner	0		155	23	gray limestone	0	155	0	30					125			
13	1.2065E+11	-89.954978	42.451844	5	28	N	5	E	Lyon, Elsie M.	owner	0		190	27	grey limestone	0	190	15	70	68	-2			120			
14	1.2065E+11	-90.014153	42.465554	35	29	N	4	E	Gundry, Jon M.	Coad, Floyd M.	0		200	40	Galena	78	200	25	36	47	11	2.27	3,409.1	164	20.79	2.79	9.81E-04
15	1.2065E+11	-90.020695	42.450984	2	28	N	4	E	Martin, Charles	owner	980	TM	220			0	0	0	0								
16	1.2065E+11	-90.017964	42.445529	2	28	N	4	E	Kaiser, Harry	Thompson, John J.	0		210	84	Galena limestone	52	210	40	48	82	34	1.18	1,764.7	162	10.89	1.46	5.14E-04
17	1.2065E+11	-90.022836	42.445519	2	28	N	4	E	Millam, Willard	Coad, Floyd M.	0		205	40	Galena	81	205	20	59	112	53	0.38	566.0	148	3.88	0.52	1.83E-04
18	1.2065E+11	-89.985509	42.438118	12	28	N	4	E	Hintz, Clarence	Coad, Floyd M.	0		245	40	Galena	75	245	15	68	75	7	2.14	3,214.3	177	18.16	2.43	8.57E-04
19	1.2065E+11	-89.952158	42.453983	5	28	N	5	E	Schwoob, Joe	Coad, Floyd M.	0		175	42	Galena	110	175	20	18	50	32	0.63	937.5	157	5.97	0.80	2.82E-04
20	1.2025E+11	-89.963157	42.432564	8	28	N	5	E	Doubler, Donald	Coad, Floyd M.	0		194	40	Galena	76	194	20	31	39	8	2.50	3,750.0	163	23.01	3.08	1.09E-03
21	1.2065E+11	-89.963623	42.434383	7	28	N	5	E	Oscar Meyer Company	owner	0		219	132	Galena	157	219	25	56	72	16	1.56	2,343.8	163	14.38	1.93	6.79E-04
22	1.2065E+11	-89.964492	42.470938	31	29	N	5	E	Crain, John F. Sr.	Lyons, Glenn L.	0		170	45	Platteville	72	170	0									
23				5	28	N	5	E	Cropper, Juanita	Geo Townsend			160	42	Guttenberg	130	160	23.5	72	104	32	0.73	1,101.6	88	12.52	1.68	5.91E-04
24		-89.983681	42.443474	7	28	N	5	E	Fay, Steve	Thompson, John J			200	61	limestone	180	200	20	16	73	57	0.35	526.3	184	2.86	0.38	1.35E-04
25	1.2065E+11	-89.972377	42.446242	6	28	N	5	E	Daly, James	owner	985	TM	176	34	limestone	0	176	10	38	44	6	1.67	2,500.0	138	18.12	2.43	8.55E-04
26	1.2065E+11	-89.94385	42.45465	4	28	N	5	E	Weckerly, Robert	Olson, Robert C	0		165	42	dolomite	83	165	10	40	55	15	0.67	1,000.0	125	8.00	1.07	3.78E-04
27	1.2065E+11	-89.943033	42.449723	4	28	N	5	E	Hilliard, Shirl	Coad, Floyd M.	0		180	40	Galena	85	180	15	26	68	42	0.36	535.7	154	3.48	0.47	1.64E-04
28	1.2025E+11	-89.948859	42.456365	5	28	N	5	E	Siebarth, Leo	Bull, Jack D.	0		145	42	rock	25	145	12	80	80	0		0.0	65			
29	1.2065E+11	-89.945381	42.457718	5	28	N	5	E	McKinstrey, Donald	Coad, Floyd M.	0		185	41	Galena	95	185	20	22	70	48	0.42	625.0	163	3.83	0.51	1.81E-04
30	1.2065E+11	-89.943827	42.452785	4	28	N	5	E	Nesbitt, Karlene	Coad, Floyd M.	0		202	40	Galena	88	202	20	35	61	26	0.77	1,153.8	167	6.91	0.93	3.26E-04
31	1.2065E+11	-89.946934	42.4553	5	28	N	5	E	Graves, Frances	Coad, Floyd M.	0		175	40	Galena	95	175	20	23	66	43	0.47	697.7	152	4.59	0.62	2.17E-04
32	1.2065E+11	-89.946336	42.456508	5	28	N	5	E	Siebarth, Dave	Bull, Jack D.	0		165	41	rock	75	165	0									

$$v = \frac{k}{n}\frac{dh}{dl}$$

Where:
- v = average linear groundwater velocity (ft/day)
- k = hydraulic conductivity (ft/day)
- n = porosity
- dh = change in head along flow path
- dl = distance between head elevations along flow path

v =	5.50E+00 ft/day		max	7.34E+00	2.59E-03
	2009.2 ft/year		min	3.60E-01	1.27E-05
k =	-9.63E-01 ft/day		Geometric Mean	9.63E-01	3.39E-04
n =	0.5%				
h1 =	960 feet				
h2 =	940 feet				
l1 =	0 feet				
l2 =	700 feet				

NEWFIELDS

DAVID P. TRAINOR, P.E., P.G.

Partner

EXPERIENCE SUMMARY

Mr. Trainor has over 29 years experience in numerous environmental projects and investigations, which include both federal (NPL, RCRA and removal action programs) and state-lead projects. Categories include disposal facility siting and design studies, RI/FS programs, groundwater assessments, remedial design, and construction management. He has represented industrial and government clients in technical negotiations for a variety of facilities and settings.

REGISTRATIONS AND PROFESSIONAL AFFILIATIONS

Professional Engineer, Wisconsin, Michigan, Pennsylvania, California, Idaho, Iowa
Professional Geologist, Wisconsin
American Society of Civil Engineers
International Society for Soil Mechanics and Foundation Engineering
American Institute of Professional Geologists, Certified Professional Geologist, AIPG

EDUCATION AND TRAINING

M.S. Civil and Environmental Engineering, University of Wisconsin, Madison, 1983
B.S. Civil Engineering, Ohio State University, 1978
B.S. Geology, Ohio State University, 1975
OSHA 40-hour Hazwoper

PROFESSIONAL HISTORY

NewFields, 2003 to present
URS Corporation (previously Dames & Moore), Principal-in-Charge/Senior Engineer, 1987 to 2003
RMT, Inc., Geotechnical Project Engineer, 1983 to 1984; 1985 to 1987
Northern Engineering and Testing, Geotechnical Project Engineer, 1984 to 1985
Terratech, Inc., Staff Engineer, 1978 to 1981

REPRESENTATIVE PROJECT EXPERIENCE

- Currently managing multi-firm RI/FS at a former ordnance manufacturing facility, NPL site; administered as a wildlife refuge by the federal Fish and Wildlife Service; Marion, Illinois.
- Managed RI/FS for NPL site, former manufactured gas plant and wood treatment site; directed remedial design and construction for interim coal tar removal system from a confined aquifer; Ashland, Wisconsin.
- Refurbished defunct groundwater extraction and pumping system; developed ozone sparge system design for low permeability soil conditions contaminated with chlorinated hydrocarbons at a former manufacturing plant. Edgerton, Wisconsin.
- Evaluated mercury migration conditions in groundwater in defense of class-action claim at a caustic soda manufacturing facility; McIntosh, Alabama.
- Oversaw USEPA removal action; negotiated groundwater cleanup costs for final settlement with Wisconsin Department of Natural Resources for a former plating facility; Elkhorn, Wisconsin.
- Developed source and groundwater characterization data for an historic industrial site contaminated with chlorinated hydrocarbons; developed in-situ and ex-situ remedial options for soil contaminated as hazardous waste; Fort Atkinson, Wisconsin

- Coordinated investigation and developed remedial options for a former manufactured gas plant site currently used as a bulk propane distribution facility. Marshfield, Wisconsin.
- Performed research and provided expert testimony about the fate and transport of gasoline contaminants released from underground storage tanks allegedly contaminating a private residence. Wisconsin.
- Coordinated and implemented environmental due diligence in preparation for acquisition for poultry processing operations at 90+ facilities. Wisconsin and Minnesota.
- Provided expert testimony at an arbitration hearing on the validity of long-term remedial costs for a landfill (Superfund site) in southeastern Wisconsin.
- Developed remedial options for several manufactured gas plant sites; New York and Pennsylvania.
- Coordinates groundwater extraction/treatment and monitoring at a plating facility site contaminating groundwater with chromium. Illinois.
- Evaluated applicability of past and future costs to validate insurance claims for remedial action at several landfill sites, Great Lakes States.
- Provided research and expert testimony at deposition for a named party at a Superfund site identifying other PRPs from individual waste stream analyses, Wisconsin.
- Directed ROD implemented remedy including a gas extraction system upgrade and point-of-entry water filter installations for private homes, municipal sanitary landfill; Hudson, Wisconsin. Included expert testimony at trail.
- Directed work plan development, negotiated USEPA approval, and directed the investigation for an abandoned landfill (NPL site); Tomah, Wisconsin.
- Oversaw design and construction of a landfill gas extraction system for an abandoned sanitary landfill; Tomah, Wisconsin.
- Provided expert testimony at deposition for a machine parts manufacturer evaluating the identification of manufactured gas plant waste disposed on their property; Milwaukee, Wisconsin.
- Provided expert testimony at trial for a paper company providing alternative water supplies for private residences affected by groundwater contamination from an industrial landfill; Eau Claire, Wisconsin.
- Developed strategy for investigating and providing cleanup options for dry-cleaning sites; Stevens Point, Wisconsin.
- Provided Agency negotiation, consultant review and oversight of an investigation and remedial options analysis for an abandoned sanitary landfill; Rice Lake, Wisconsin.
- Directed remedial design and remedial action oversight including final cover and landfill gas control, for an abandoned municipal waste landfill; Wausau, Wisconsin.
- Directed remedial design activities, including final cover and landfill gas control, for an abandoned municipal waste landfill; Rhinelander, Wisconsin.
- Performed a groundwater assessment, negotiated Agency approval for a selected remedial option, and directed construction management of a leachate extraction system for a paper waste landfill; Eau Claire, Wisconsin.
- Directed preparation of design plans and specifications, and construction management for remediation of 200,000 cubic yards of mining wastes under the Wisconsin Environmental Repair Program; Mineral Point, Wisconsin.
- Provided expert testimony at trial for food processing company siting a solid waste disposal facility; case involved potential groundwater contamination from biological residues originating from waste land-spreading.
- Provided expert testimony at deposition for a defendant for insurance claims at a foundry waste site (contaminated with lead); Milwaukee, Wisconsin.

- Prepared and implemented USEPA-approved RCRA facility investigation work plan for a hazardous waste incinerator (CWM Chemical Services); Chicago, Illinois.
- Directed preparation of Plan of Operation for a 3.5 million cubic yard sanitary landfill, including expert testimony before the Waste Facility Siting Board; Madison, Wisconsin.
- Directed preparation of plans and specifications for landfill cover restoration, state Superfund site; Madison, Wisconsin.
- Directed a remedial investigation and feasibility study for groundwater remediation options for an abandoned landfill; Dane County, Wisconsin.
- Directed remedial investigation for a former wood treatment (creosote) facility; Reed City, Michigan.
- Negotiated language for a voluntary consent order and directed investigation for a landfill remedial investigation (PRP group); Madison, Wisconsin.
- Coordinated design and construction of a landfill gas extraction system; Madison, Wisconsin.
- Directed preparation of a Feasibility Study and hydrogeologic assessment for a 1.5 million cubic yard industrial landfill; Wisconsin.
- Coordinated investigations and developed remediation options for several abandoned city sanitary landfills; Madison, Wisconsin.
- Developed a Feasibility Study for a 4 million cubic yard sanitary landfill, and provided expert testimony at a contested-case hearing; Madison, Wisconsin.
- Supervised subsurface investigations and prepared recommendations for remediation of two chlorinated hydrocarbon spill sites; Wisconsin manufacturing facilities.
- Supervised subsurface investigations and prepared hydrogeologic reports for several closed municipal landfill sites; Madison, Wisconsin.
- Prepared RCRA facility investigation work plan for a large military defense contractor (Hamilton Standards); Windsor Locks, Connecticut.
- Developed remediation options for PCB-contaminated soils at an aluminum manufacturing plant; Kentucky.
- Developed an environmental and economic assessment for a county siting a hazardous waste facility; Minnesota.
- Prepared feasibility/plan of operation report for a PCB transformer salvage facility; Juneau, Wisconsin.
- Designed a vacuum extraction system for remediation of an underground gasoline spill at a service station; Madison, Wisconsin.
- Designed and supervised construction of clay-lined earthen impoundments with dewatering facilities for foundry process sludge for a large industrial foundry facility; Defiance, Ohio.
- Devised geotechnical testing programs of various waste materials generated from paper manufacturing processes.
- Provided geotechnical analysis and recommendations for repair of a failure in a clay liner sidewall for a sanitary landfill; Minneapolis.
- Designed and implemented a modified multi-unit triaxial device to study the effects of leachate permeants on clay soils.
- Designed and provided construction documentation, kiln dust disposal facility; Alpena, Michigan.
- Designed and provided construction documentation, sanitary landfill; Minneapolis.
- Designed and provided construction documentation, foundry waste landfill; Milwaukee.
- Performed hydrogeological assessment of a solvent spill for an underground storage tank; South Bend, Indiana.

- Determined stability and projected settlements of embankments for bridge foundation; Idaho.
- Designed foundation and retaining structure recommendations for various commercial, industrial and transportation facilities; Idaho, Oregon and Washington.
- Designed foundation systems for residential, commercial and industrial buildings constructed on problem soils; San Francisco Bay area.
- Developed recommendations for the repair of residential structures damaged by soil expansion and settlement; San Francisco Bay area.
- Analyzed static and dynamic seacliff erosion and provided setback recommendations for a coastal development; Aptos, California.

PUBLICATIONS AND PRESENTATIONS

Author, "The Results of Treating MGP Generated Tar with an Innovative In-Situ Chemical Oxidation Technology at a former MGP Site in Northern Wisconsin," Remtech09 conference, 2009

Author, "Strengths of GIS Application on Site Characterization," American Gas Association – MGP Workshop, 2006.

Author, "Characterization and Remedial Action at a Former MGP Adjacent to a Former Wood Treatment Operation," Gas Technology Institute Site Remediation Technologies Conference, 2000.

Co-author, "Isotopic Identification of the source of Methane in Subsurface Sediments of an Area Surrounded by Waste Disposal Facilities," in Applied Geochemistry, USGS, 1998.

Co-author, "Groundwater Remediation at a DeInk Landfill," TAPPI Environmental Conference, 1994.

Author, "Isotope Aging to Determine Methane Gas Sources, Geological Society of America, National Conference, 1992.

Author, "Current Status of Environmental Assessments," Government Institutes Seminar, Madison, 1992.

Author, "RCRA Corrective Action – 1990," paper presented to the Minnesota State Bar Association, Minneapolis, 1990.

Author, "Investigation and Remediation of a Printing Solvent Release," paper presented at the short course Detection and Corrective Action for Leaking Underground Storage Tanks, Department of Engineering-Professional Development, University of Wisconsin, Madison, 1989.

Co-author, "Case Studies in Constructive Use of Foundry Wastes for Landfill Construction," paper presented at the American Foundrymen's Society Casting Conference, 1987.

Author, "Moisture and Saturation Effects on Hydraulic Conductivity Testing," paper presented at the ninth annual Madison Waste Conference, 1986.

Co-author, "Use of Foundry Quenched Slag - Drainage Medium," presented at the 1986 Madison Waste Conference.

LABORATORY COMPACTION CHARACTERISTICS OF SOIL

Report Number: 07075126.0001
Service Date: January 28, 2008

Terracon
870 40th Avenue
Bettendorf, IA 52722
(563) 355-0702

Client: Traditional Family Dairies
Exemption (b)(6)
15857 Bear Mountain Blvd
Bakersfield CA 93311

Report Date: January 28, 2008
Project: Traditional Family Dairies N. and S. Facility
Highway 78
Warren, IL

Project Number: 07075126

Material Information

Contractor:
Source of Material: Depths 1 to 5 Feet
Proposed Use:
USCS:

Sample Information

Sampled By:
Sample Location: Borings S8 and S10

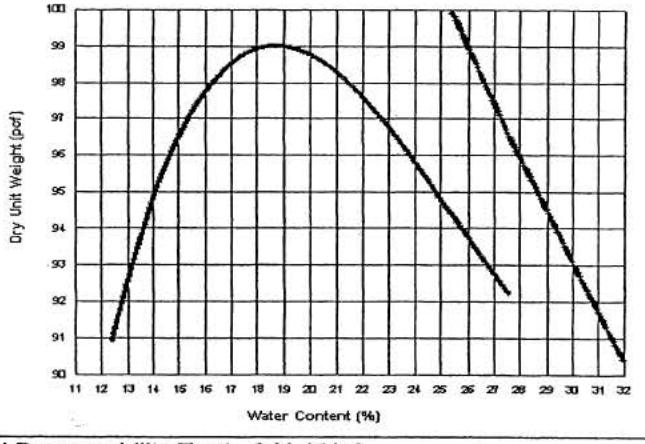
Sample Description: Dark Brown Fat Clay

Laboratory Test Data

Test Procedure:	ASTM D 698
Test Method:	Method A
Sample Preparation:	Moist Preparation
Rammer Type:	Mech. Rammer
Maximum Dry Unit Weight, pcf:	99.0
Optimum Water Content, %:	18.5

	Result	Specifications
Liquid Limit:	51	
Plastic Limit:	19	
Plasticity Index:	32	
% Passing #40:	NA	
% Passing #200:	NA	

Moisture Density Relations
Zero Air Voids Curve for assumed specific gravity 2.70



Comments: Laboratory Constant Head Permerability Test: 3 X 10^-8

Services-Obtain a sample of fill material at the project site and return it to the laboratory. Prepare and test the sample for moisture-density relationship.

Report Distribution:
Traditional Family Dairies
Terracon Stutz Inc

Reviewed by: _____
William K. Beck
Office Manager III

Q16

LABORATORY COMPACTION CHARACTERISTICS OF SOIL

Report Number: 07075126.0002
Service Date: January 28, 2008

Terracon
870 40th Avenue
Bettendorf, IA 52722
(563) 355-0702

Client: Traditional Family Dairies
Exemption (b)(6)
15857 Bear Mountain Blvd
Bakersfield CA 93311

Report Date: January 28, 2008
Project: Traditional Family Dairies N. and S. Facility
Highway 78
Warren, IL

Project Number: 07075126

Material Information

Contractor:
Source of Material: Depths 1 to 5 Feet
Proposed Use:
USCS:

Sample Information

Sampled By:
Sample Location: Boring S7 and S15

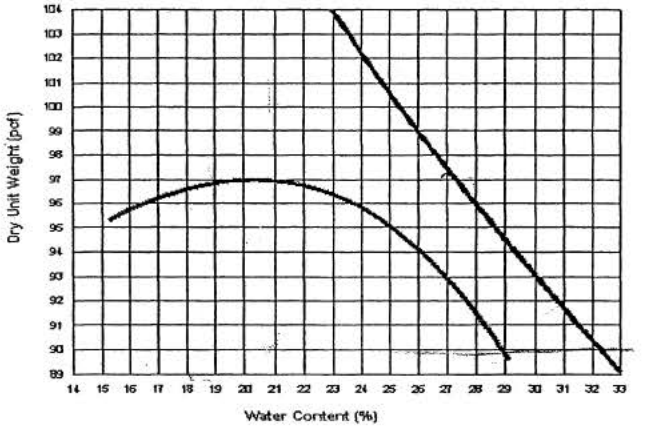
Sample Description: Dark Brown Lean to Fat Clay

Laboratory Test Data

Test Procedure:	ASTM D 698
Test Method:	Method A
Sample Preparation:	Moist Preparation
Rammer Type:	Mech. Rammer
Maximum Dry Unit Weight, pcf:	97.0
Optimum Water Content, %:	20.5

	Result	Specifications
Liquid Limit:	52	
Plastic Limit:	21	
Plasticity Index:	31	
% Passing #40:	NA	
% Passing #200:	NA	

Moisture Density Relations
Zero Air Voids Curve for assumed specific gravity 2.70



Comments: Laboratory Constant Head Permerability Test: 6 X 10^-8

Report Distribution:
Traditional Family Dairies
Farmer Stutz Inc

Reviewed by: _____
William K. Beck
Office Manager III

LABORATORY COMPACTION CHARACTERISTICS OF SOIL

Report Number: 07075126.0003
Service Date: January 28, 2008

Ilerracon
870 40th Avenue
Bettendorf, IA 52722
(563) 355-0702

nt: Traditional Family Dairies
Exemption (b)(6)
15857 Bear Mountain Blvd
Bakersfield CA 93311

Report Date: January 28, 2008
Project: Traditional Family Dairies N. and S. Facility
Highway 78
Warren, IL

Project Number: 07075126

Material Information

Contractor:
Source of Material: Depth 1 to 5 Feet
Proposed Use:
USCS:

Sample Information

Sampled By:
Sample Location: Borings N14 and N15,

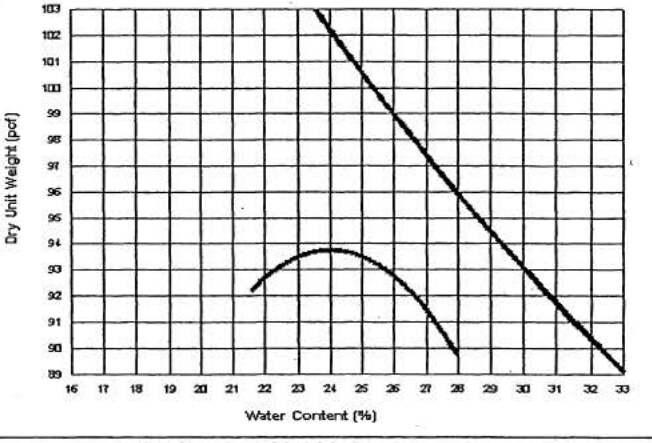
Sample Description: Dark Brown Fat Clay

Laboratory Test Data

Test Procedure:	ASTM D 698
Test Method:	Method A
Sample Preparation:	Moist Preparation
Rammer Type:	Mech. Rammer
Maximum Dry Unit Weight, pcf:	93.5
Optimum Water Content, %:	24.0

	Result	Specifications
Liquid Limit:	67	
Plastic Limit:	26	
Plasticity Index:	41	
% Passing #40:	NA	
% Passing #200:	NA	

Moisture Density Relations
Zero Air Voids Curve for assumed specific gravity 2.70



Comments: Laboratory Constant Head Permerability Test: 2 X 10^-8

Report Distribution:
2) Traditional Family Dairies
rer Stutz Inc

Reviewed by: _____

William K. Beck
Office Manager III

LABORATORY COMPACTION CHARACTERISTICS OF SOIL

Report Number: 07075126.0004
Service Date: January 28, 2008

Terracon
870 40th Avenue
Bettendorf, IA 52722
(563) 355-0702

nt: Traditional Family Dairies
Exemption (b)(6)
15857 Bear Mountain Blvd
Bakersfield CA 93311

Report Date: January 28, 2008
Project: Traditional Family Dairies N. and S. Facility
Highway 78
Warren, IL

Project Number: 07075126

Material Information

Contractor:
Source of Material: Depth 1 to 5 Feet
Proposed Use:
USCS:

Sample Information

Sampled By:
Sample Location: Borings N10 and N12

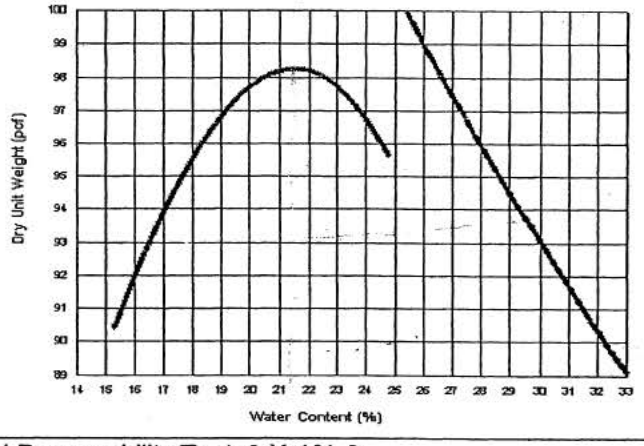
Sample Description: Dark Brown Fat Clay

Laboratory Test Data

Test Procedure:	ASTM D 698
Test Method:	Method A
Sample Preparation:	Moist Preparation
Rammer Type:	Mech. Rammer
Maximum Dry Unit Weight, pcf:	98.0
Optimum Water Content, %:	21.5

	Result	Specifications
Liquid Limit:	57	
Plastic Limit:	12	
Plasticity Index:	45	
% Passing #40:	NA	
% Passing #200:	NA	

Moisture Density Relations
Zero Air Voids Curve for assumed specific gravity 2.70

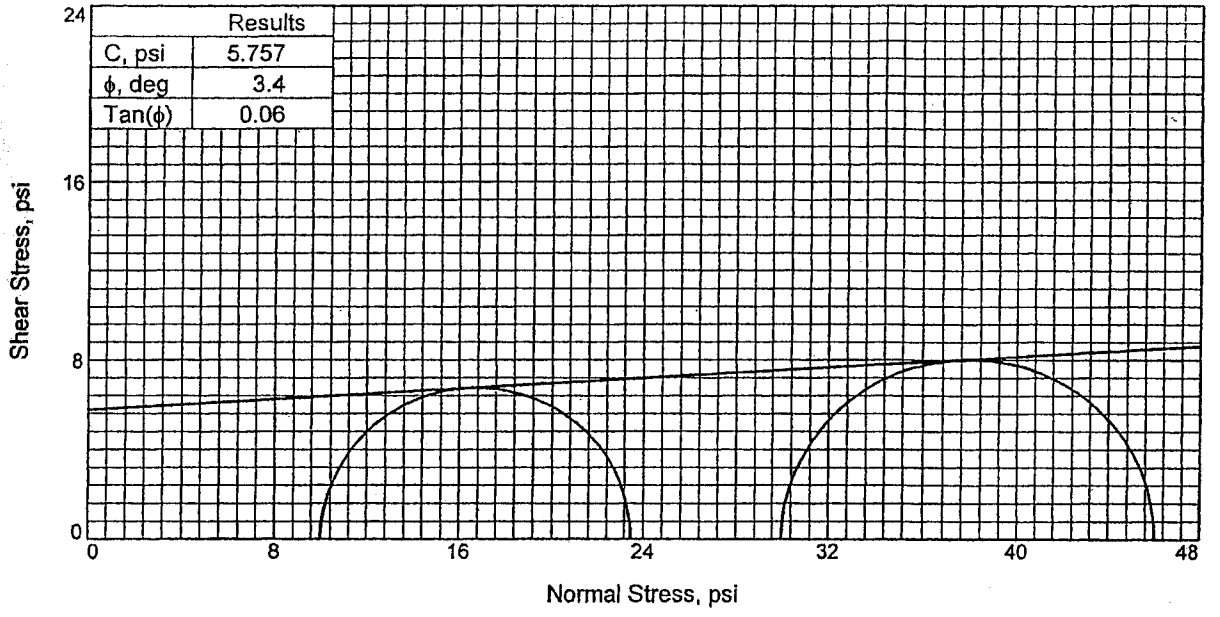


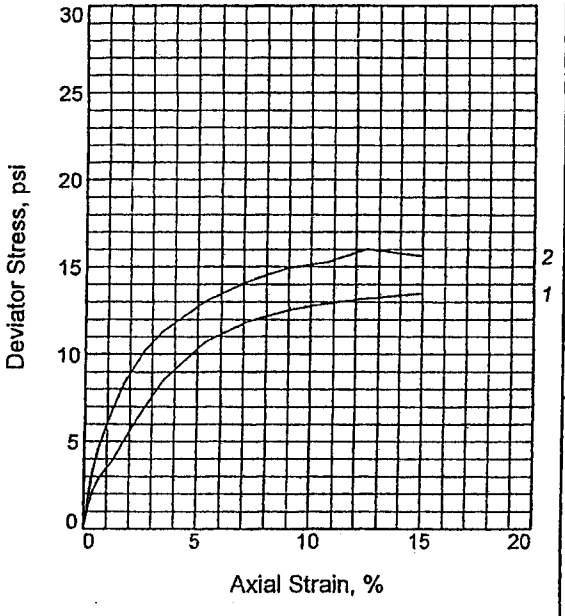
Comments: Laboratory Constant Head Permerability Test: 9 X 10^-8

Report Distribution:
) Traditional Family Dairies
rer Stutz Inc

Reviewed by: _____

William K. Beck
Office Manager II





Sample No.		1	2
Initial	Water Content,	31.3	27.1
	Dry Density, pcf	85.2	94.4
	Saturation,	86.3	93.3
	Void Ratio	0.9774	0.7853
	Diameter, in.	2.810	2.830
	Height, in.	5.600	5.600
At Test	Water Content,	36.2	29.1
	Dry Density, pcf	85.2	94.4
	Saturation,	100.0	100.0
	Void Ratio	0.9774	0.7853
	Diameter, in.	2.810	2.830
	Height, in.	5.600	5.600
Strain rate, in./min.		0.500	0.500
Back Pressure, psi		0.00	0.00
Cell Pressure, psi		10.00	30.00
Fail. Stress, psi		13.49	16.03
Ult. Stress, psi			
σ_1 Failure, psi		23.49	46.03
σ_3 Failure, psi		10.00	30.00

Type of Test:
Unconsolidated Undrained
Sample Type: ST
Description: BLACK CLAY LOAM, MOIST - STIFF
LL= 41 **PL=** 24 **PI=** 17
Specific Gravity=
Remarks: Lab No. 3800

Figure _____

Client: MAURER STUTZ, INC

Project: TRADITION DAIRY ADDITIONAL TESTING

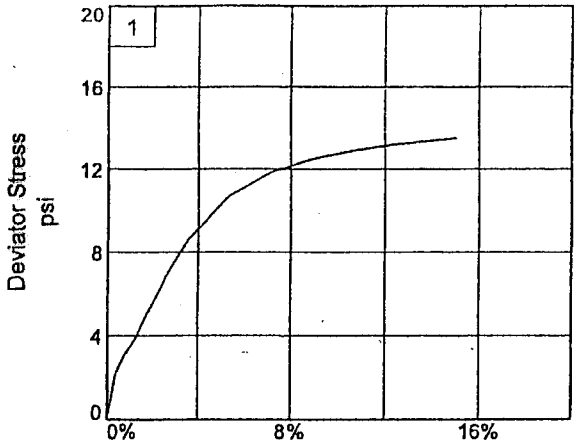
Source of Sample: 17-1 **Depth:** 1-3'
Sample Number: ST
Proj. No.: 07075126 **Date:** 4-18-08

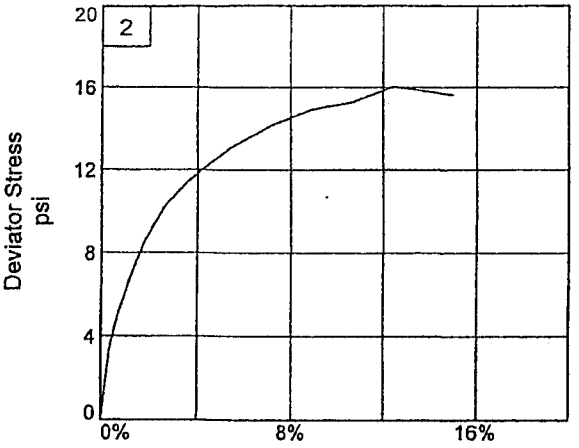
TRIAXIAL SHEAR TEST REPORT

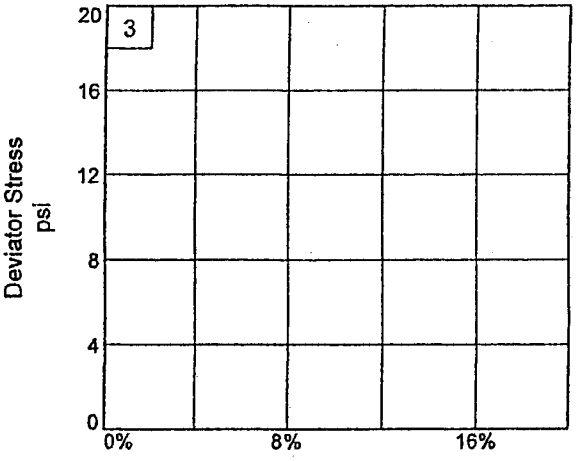
H. C. NUTTING COMPANY

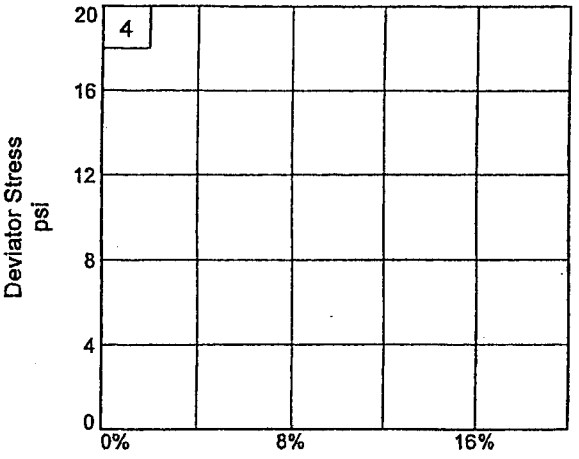
Tested By: SV **Checked By:** GS

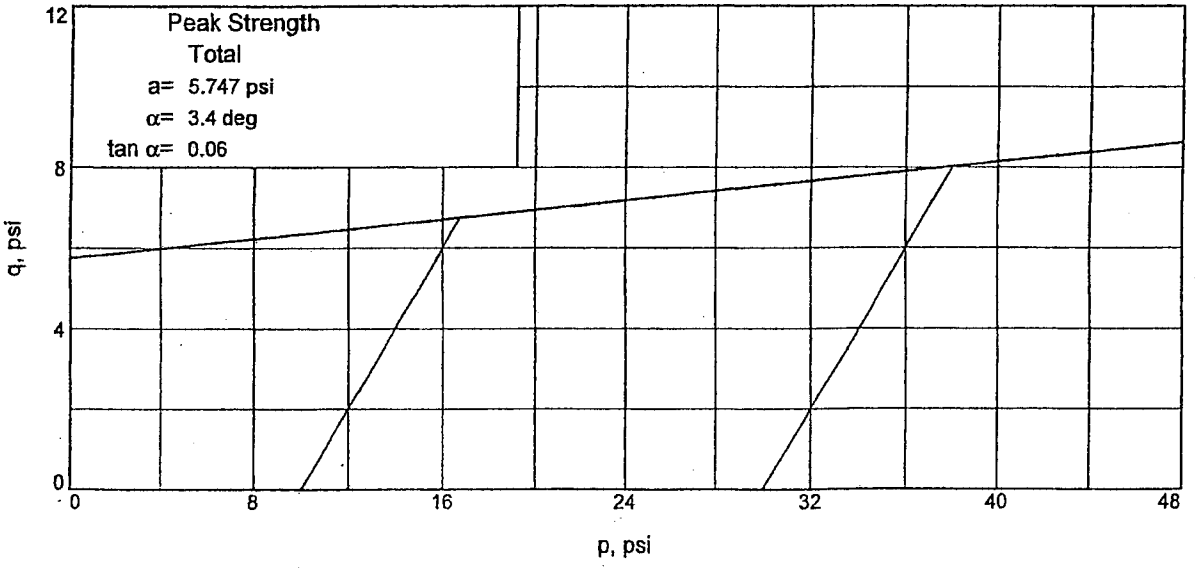
BUS 002391











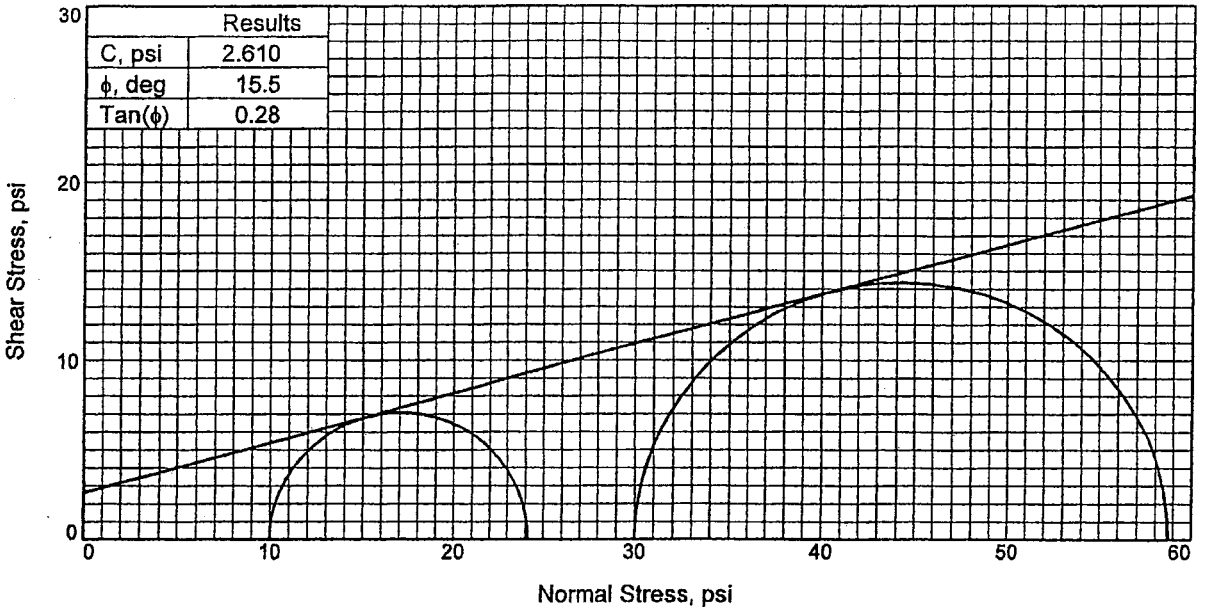
Client: MAURER STUTZ, INC
Project: TRADITION DAIRY ADDITIONAL TESTING
Source of Sample: 17-1 **Depth:** 1-3' **Sample Number:** ST
Project No.: 07075126 **Figure** _____

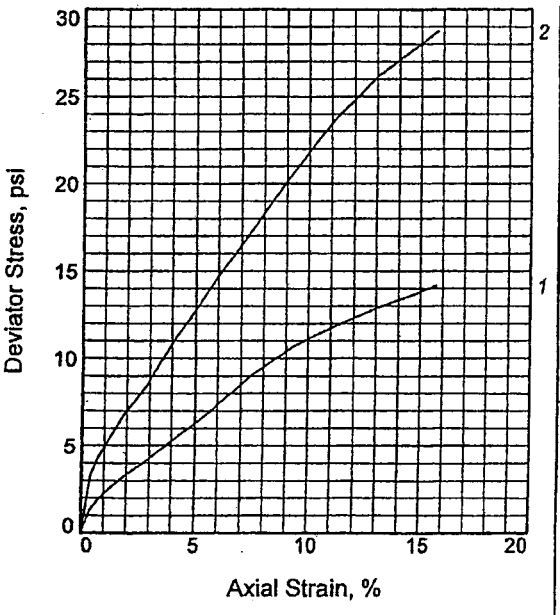
H. C. NUTTING COMPANY

Tested By: SV **Checked By:** GS

B-5 002392

Results	
C, psi	2.610
ϕ, deg	15.5
Tan(ϕ)	0.28





Sample No.		1	2
Initial	Water Content,	25.3	26.2
	Dry Density, pcf	99.0	98.0
	Saturation,	97.3	98.4
	Void Ratio	0.7032	0.7203
	Diameter, in.	2.820	2.780
	Height, in.	5.340	5.340
At Test	Water Content,	26.0	26.7
	Dry Density, pcf	99.0	98.0
	Saturation,	100.0	100.0
	Void Ratio	0.7032	0.7203
	Diameter, in.	2.820	2.780
	Height, in.	5.340	5.340
Strain rate, in./min.		0.500	0.500
Back Pressure, psi		0.00	0.00
Cell Pressure, psi		10.00	30.00
Fail. Stress, psi		14.16	28.74
Ult. Stress, psi			
σ_1 Failure, psi		24.16	58.74
σ_3 Failure, psi		10.00	30.00

Type of Test: Unconsolidated Undrained
Sample Type: ST
Description: DARK BROWN SANDY LEAN CLAY
LL= 38 **PL=** 21 **PI=** 17
Specific Gravity= 2.70
Remarks: Lab No. 3801
Point 1&2 from tube 17-3

Figure _____

Client: MAURER STUTZ, INC

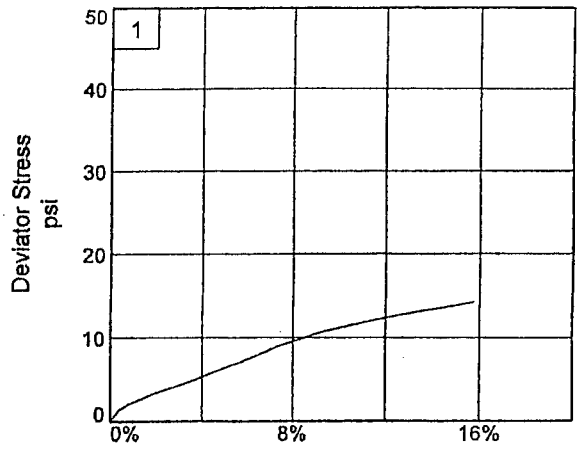
Project: TRADITION DAIRY ADDITIONAL TESTING

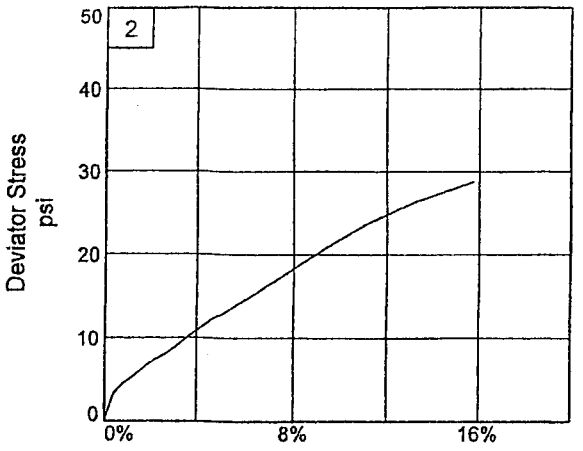
Source of Sample: 17-3 **Depth:** 5-7'
Sample Number: 3
Proj. No.: 07075126 **Date:** 4-18-08

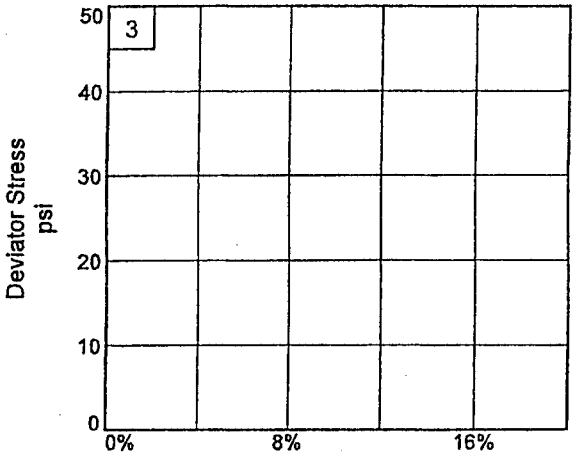
TRIAXIAL SHEAR TEST REPORT

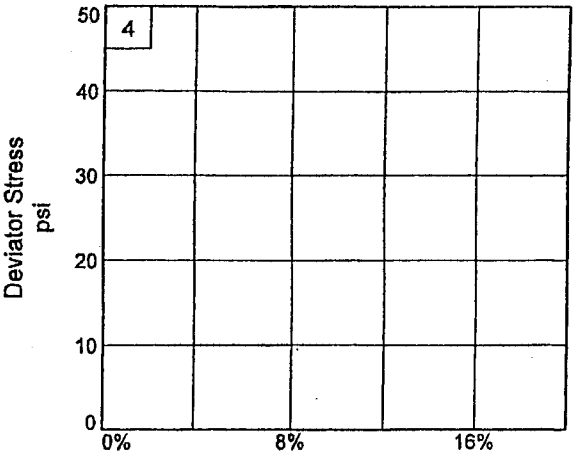
H. C. NUTTING COMPANY

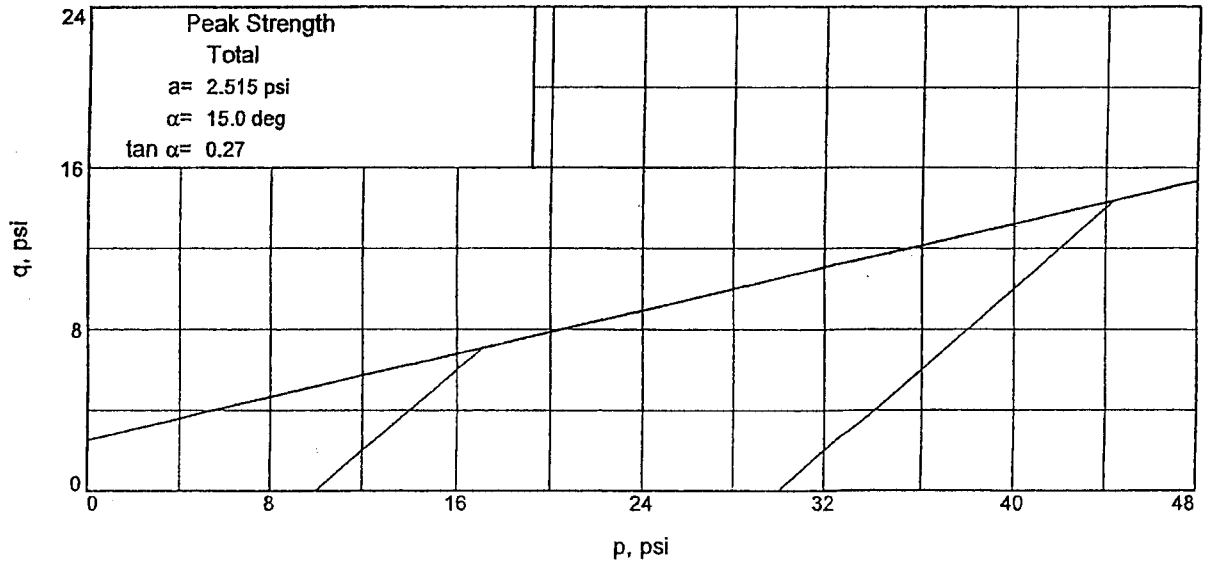
Tested By: SV **Checked By:** GS











Client: MAURER STUTZ, INC
Project: TRADITION DAIRY ADDITIONAL TESTING
Source of Sample: 17-3 **Depth:** 5-7' **Sample Number:** 3
Project No.: 07075126 **Figure** _____

H. C. NUTTING COMPANY

Tested By: SV **Checked By:** GS

LABORATORY COMPACTION CHARACTERISTICS OF SOIL

Report Number: 07082013.0002
Service Date: June 25, 2008

Terracon
870 40th Avenue
Bettendorf, IA 52722
(563) 355-0702

Client: The Hamstra Group, Inc
Exemption (b)(6)

Report Date: August 18, 2008 **REVISED
Project: Tradition Family Dairies Facility
-
Warren, IL

Project Number: 07082013

Material Information

Contractor: Loberg Excavating
Source of Material: In-place
Proposed Use: general site fill
USCS:

Sample Information

Sampled By: Terry L. Markle
Sample Location: P 17

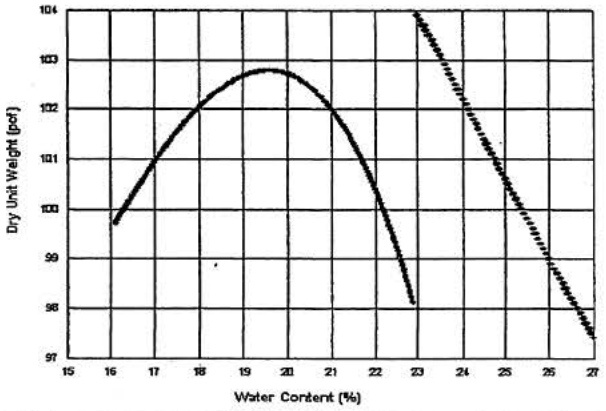
Sample Description: Brown lean to fat clay

Laboratory Test Data

Test Procedure:	ASTM D 698
Test Method:	Method A
Sample Preparation:	Moist Preparation
Rammer Type:	Mech. Rammer
Maximum Dry Unit Weight, pcf:	103.0
Optimum Water Content, %:	19.5

	Result	Specifications
Liquid Limit:	NA	
Plastic Limit:	NA	
Plasticity Index:	NA	
% Passing #40:	NA	
% Passing #200:	NA	

Moisture Density Relations
Zero Air Voids Curve for assumed specific gravity 2.70



Comments: Coefficient of Permeability Value = 1.2x10^-8 cm/second

Services-Obtain a sample of fill material at the project site and return it to the laboratory. Prepare and test the sample for moisture-density relationship.

Report Distribution:
(1) The Hamstra Group, Inc

Terracon Rep: Brian K.Strickler

Reviewed by: Cale J. Wilson
Construction Services Manager

06-/R06-Future Key

REPORT OF LABORATORY TEST RESULTS

Report Number: 07082013.0009
Service Date: August 13, 2008

Terracon
870 40th Avenue
Bettendorf, IA 52722
(563) 355-0702

Client:
The Hamstra Group, Inc
Exemption (b)(6)

Report Date: September 08, 2008
Project: Tradition Family Dairies Facility
-
Warren, IL

Project No.: 07082013

Services:

As requested, a Terracon representative traveled to the project site to obtain samples for permeability testing of material proposed for use as a clay liner at the north and west lagoons. Thin-walled tubes were utilized to obtain the samples. The samples were transported to our laboratory and constant head permeability tests were performed. The location and test result of each sample is shown below.

	Test Location	Coefficient of Permeability
P17	North lagoon - N42.26/59.55940 W89.58/14.00809	2.2x10^-8 cm/sec
P17	North lagoon - N42.26/59.37865 W89.58/19.47425	1.2x10^-8 cm/sec
P14	West lagoon - N42.26/5691187 W89.58/23.85611	2.5x10^-8 cm/sec

All in-situ native subgrade soils of ponds.

Terracon Rep: John C.Downing

Report Distribution:
(1) The Hamstra Group, Inc
(1) Maurer Stutz Inc;
tfeldmann@maurerstutzinc.com

Reviewed by: Gale J. Wilson
Gale J. Wilson
Construction Services Manager

REPORT OF LABORATORY TEST RESULTS

Report Number: 07082013.0011
Service Date: August 1, 2008

Terracon
870 40th Avenue
Bettendorf, IA 52722
(563) 355-0702

Client:
The Hamstra Group, Inc
Exemption (b)(6)

Report Date: August 18, 2008
Project: Tradition Family Dairies Facility
-
Warren, IL

Project No.: 07082013

Services:

As requested, a Terracon representative obtained samples of on site material that was excavated from the north detention basin (P17). The samples were obtained from the northeast corner and the midpoint of the south edge of detention basin P17 at an elevation of about 6 feet above final grade for the detention pond. The samples were visually classified as brown lean clay and gray-brown lean clay at locations 1 and 2, respectively. The samples were transported to our laboratory for testing. The samples were evaluated to determine the Atterberg limits of each sample and the results are as follows:

Sample	LL	PI	Classification
1	36	16	CL
2	33	14	CL

Terracon Rep: Nicholas D. Sorensen

Report Distribution:
(1) The Hamstra Group, Inc

Reviewed by: Cale J. Wilson
Cale J. Wilson
Construction Services Manager

LABORATORY COMPACTION CHARACTERISTICS OF SOIL

Report Number: 07082013.0063
Service Date: 10/13/08
Report Date: 10/15/08

Terracon
870 40th Ave
Bettendorf, IA 52722
563-355-0702

Client

The Hamstra Group, Inc
Exemption (b)(6)

Project

Tradition Family Dairies Facility
-
Warren, IL

Project Number 07082013

Material Information

Source of Material: On Site
Proposed Use: Fill – Clay liner

Sample Information

Sample Date: 10/13/08
Sampled By: John C.Downing
Sample Location: Bottom of West Waste Pond – Compacted Clay liner

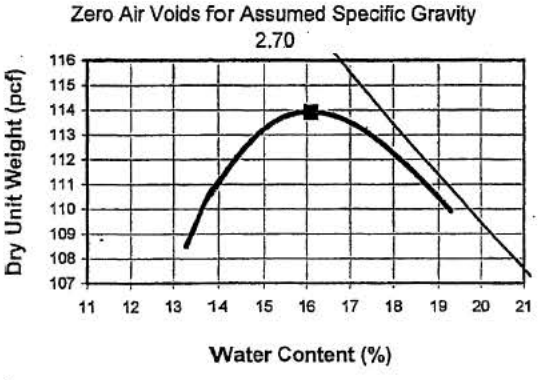
Sample Description: Reddish Brown Lean Clay

Laboratory Test Data

Test Procedure: ASTM D698
Test Method: Method A
Sample Preparation: Wet
Rammer Type: Mechanical
Maximum Dry Unit Weight (pcf): 113.9
Optimum Water Content (%): 16.1

	Result	Specifications
Liquid Limit:	35	
Plastic Limit:	20	
Plasticity Index:	15	
In-Place Moisture (%):		

USCS: CL



Comments:

Services: Obtain a sample of fill material at the project site and return it to the laboratory. Prepare and test the sample for moisture-density relationship.

Terracon Rep: Travis A.Tuegel
Reported To:
Contractor:

Report Distribution:
(1) The Hamstra Group, Inc
(1) Maurer Stutz Inc, tfeldmann@maurerstutzinc.com

Reviewed By:

Cale J. Wilson
Construction Services Manager

Test Methods:

LABORATORY COMPACTION CHARACTERISTICS OF SOIL

Report Number: 07082013.0065
Service Date: 10/16/08
Report Date: 10/16/08

Terracon
870 40th Ave
Bettendorf, IA 52722
563-355-0702

Client

The Hamstra Group, Inc
Exemption (b)(6)

Project

Tradition Family Dairies Facility
-
Warren, IL

Project Number 07082013

Material Information

Source of Material: On site
Proposed Use: General fill – clay liner

Sample Information

Sample Date: 10/13/08
Sampled By: John C.Downing
Sample Location: West pond, 280' south of northwest corner

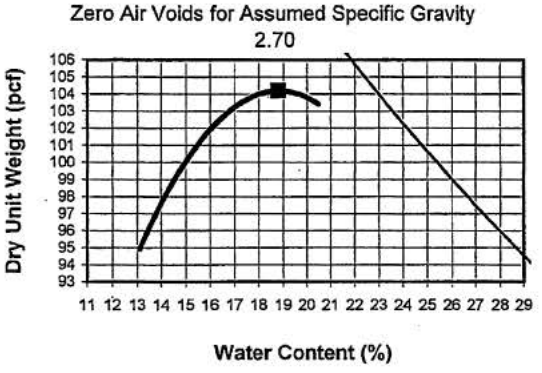
Sample Description: Brown lean clay

Laboratory Test Data

Test Procedure: ASTM D698
Test Method: Method A
Sample Preparation: Wet
Rammer Type: Mechanical
Maximum Dry Unit Weight (pcf): 104.2
Optimum Water Content (%): 18.8

	Result	Specifications
Liquid Limit:		
Plastic Limit:		
Plasticity Index:		
In-Place Moisture (%):		

USCS:



Comments:

Services: Obtain a sample of fill material at the project site and return it to the laboratory. Prepare and test the sample for moisture-density relationship.

Terracon Rep: Travis A.Tuegel
Reported To:
Contractor:

Report Distribution:
(1) The Hamstra Group, Inc
(1) Maurer Stutz Inc, tfeldmann@maurerstutzinc.com

Reviewed By: Cale J. Wilson
Cale J. Wilson
Construction Services Manager

Test Methods:

LABORATORY COMPACTION CHARACTERISTICS OF SOIL

Report Number: 07082013.0072
Service Date: 10/22/08
Report Date: 11/06/08

Terracon
870 40th Ave
Bettendorf, IA 52722
563-355-0702

Client

The Hamstra Group, Inc
Exemption (b)(6)

Project

Tradition Family Dairies Facility
-
Warren, IL

Project Number 07082013

Material Information

Source of Material: On Site
Proposed Use: South Lagoon Liner - P14

Sample Information

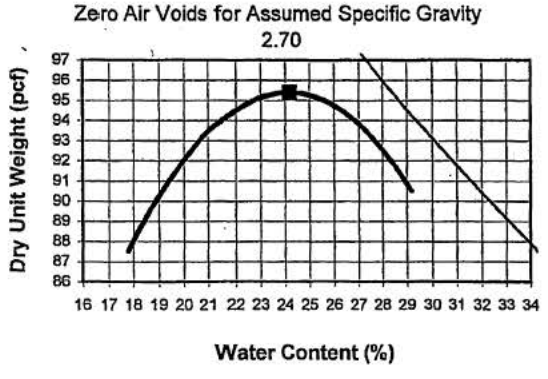
Sample Date: 10/21/08
Sampled By: Kevin M.Podstawa
Sample Location: 100' north, 35' west from bottom of north slope - P14 Liner
Sample Description: Brown/Gray Fat Clay with Sand

Laboratory Test Data

Test Procedure: ASTM D698
Test Method: Method A
Sample Preparation: Wet
Rammer Type: Manual
Maximum Dry Unit Weight (pcf): 95.4
Optimum Water Content (%): 24.2

	Result	Specifications
Liquid Limit:	68	
Plastic Limit:	31	
Plasticity Index:	37	
In-Place Moisture (%):	23.6	
Passing #200 (%):	72.2	

USCS: CH



Comments:

Services: Obtain a sample of fill material at the project site and return it to the laboratory. Prepare and test the sample for moisture-density relationship.

Terracon Rep: Terry L. Markle
Reported To:
Contractor:

Report Distribution:
(1) The Hamstra Group, Inc
(1) Maurer Stutz Inc, tfeldmann@maurerstutzinc.com

Reviewed By: Cale J. Wilson
Cale J. Wilson
Construction Services Manager

Test Methods:

LABORATORY TESTING REPORT

Report Number: 07082013.0074
Service Date: 10/03/08
Report Date: 11/06/08

Terracon
870 40th Ave
Bettendorf, IA 52722
563-355-0702

Client
The Hamstra Group, Inc
Exemption (b)(6)

Project
Tradition Family Dairies Facility
-
Warren, IL

Project Number: 07082013

P14 - Liner

As requested, a Terracon representative performed laboratory testing on two (2) samples of fat clay from the clay liner of the south lagoon at about 1 foot below finished liner elevation. The samples were obtained from field density test locations at approximately 100 feet south and 36 feet west from the bottom of the north slope and 173 feet south and 23 feet east from the bottom of the north slope. The in-place laboratory moisture contents of the samples obtained were 23.6% and 22.3%, respectively.

Services: Pick up of material sample as requested and/or required by the project specifications.

Terracon Rep.: Kevin M.Podstawa
Reported To:
Contractor:
Report Distribution:
(1) The Hamstra Group, Inc

(1) Maurer Stutz Inc,
tfeldmann@maurerstutzinc.com

Reviewed By:

Cale J. Wilson
Construction Services Manager

LABORATORY COMPACTION CHARACTERISTICS OF SOIL

Report Number: 07082013.0078
Service Date: 10/23/08
Report Date: 11/06/08

Terracon
870 40th Ave
Bettendorf, IA 52722
563-355-0702

Client

The Hamstra Group, Inc

Exemption (b)(6)

Project

Tradition Family Dairies Facility
-
Warren, IL

Project Number 07082013

Material Information

Source of Material: Bottom of East Lagoon
Proposed Use: South Lagoon Liner – P14

Sample Information

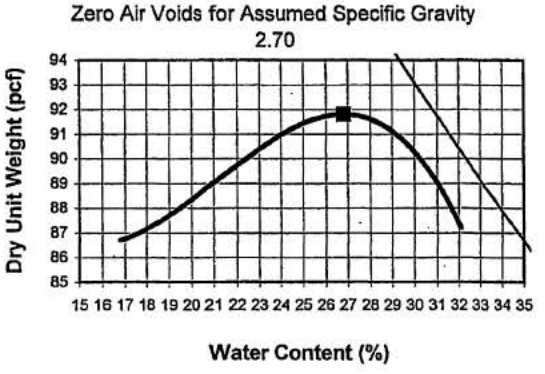
Sample Date: 10/22/08
Sampled By: Kevin M.Podstawa
Sample Location: 140' south, 35' west of bottom of north slope
P 14
Sample Description: Reddish brown lean to fat clay trace sand

Laboratory Test Data

Test Procedure: ASTM D698
Test Method: Method A
Sample Preparation: Wet
Rammer Type: Mechanical
Maximum Dry Unit Weight (pcf): 91.8
Optimum Water Content (%): 26.8

	Result	Specifications
Liquid Limit:	76	
Plastic Limit:	24	
Plasticity Index:	52	
In-Place Moisture (%):		
Passing #200 (%):	89.0	

USCS: CH



Comments:

Services: Single Proctor Point

Terracon Rep: Travis A.Tuegel
Reported To:
Contractor:

Report Distribution:
(1) The Hamstra Group, Inc
(1) Maurer Stutz Inc, tfeldmann@maurerstutzinc.com

Reviewed By:

Cale J. Wilson
Construction Services Manager

Test Methods:

The tests were performed in general accordance with applicable ASTM, AASHTO, or DOT test methods. This report is exclusively for the use of the client indicated above and shall not be reproduced except in full without the written consent of our company. Test results transmitted herein are only applicable to the actual samples tested at the location(s) referenced and are not necessarily indicative of the properties of other apparently similar or identical materials.

LABORATORY COMPACTION CHARACTERISTICS OF SOIL

Report Number: 07082013.0079
Service Date: 10/23/08
Report Date: 11/06/08

Terracon
870 40th Ave
Bettendorf, IA 52722
563-355-0702

Client

The Hamstra Group, Inc
Exemption (b)(6)

Project

Tradition Family Dairies Facility
-
Warren, IL

Project Number 07082013

Material Information

Source of Material: On site
Proposed Use: South Lagoon Liner - P14

Sample Information

Sample Date: 10/22/08
Sampled By: Kevin M.Podstawa
Sample Location: East Lagoon - P14

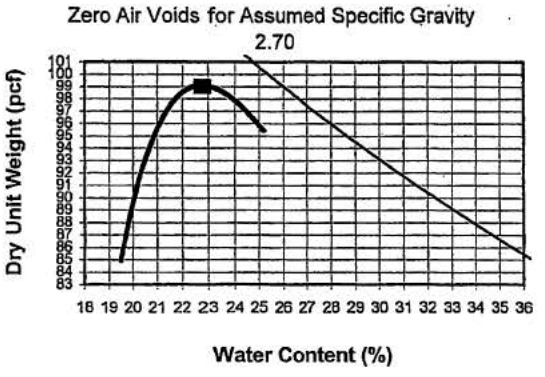
Sample Description: Light brown to gray fat clay with sand

Laboratory Test Data

Test Procedure: ASTM D698
Test Method: Method A
Sample Preparation: Wet
Rammer Type: Mechanical
Maximum Dry Unit Weight (pcf): 99.0
Optimum Water Content (%): 22.8

	Result	Specifications
Liquid Limit:	71	
Plastic Limit:	24	
Plasticity Index:	47	
In-Place Moisture (%):		
Passing #200 (%):	76.8	

USCS: CH



Comments:

Services: Obtain a sample of fill material at the project site and return it to the laboratory. Prepare and test the sample for moisture-density relationship.

Terracon Rep: Cassidy J. Voss
Reported To:
Contractor:

Report Distribution:
(1) The Hamstra Group, Inc
(1) Maurer Stutz Inc, tfeldmann@maurerstutzinc.com

Reviewed By:

Cale J. Wilson
Construction Services Manager

Test Methods:

The tests were performed in general accordance with applicable ASTM, AASHTO, or DOT test methods. This report is exclusively for the use of the client indicated above and shall not be reproduced except in full without the written consent of our company. Test results transmitted herein are only applicable to the actual samples tested at the location(s) referenced and are not necessarily indicative of the properties of other apparently similar or identical materials.

TELEPHONE
309-673-2131
TESTS ★ INVESTIGATIONS
ANALYSIS ★ DESIGN ★ EVALUATIONS
CONSULTATION ★ REPORTS ★ INSPECTIONS
ARBITRATION ★ EXPERT WITNESS TESTIMONY
★ ★ ★ ★ ★ ★ ★ ★ ★ ★
SOILS ★ PORTLAND CEMENT CONCRETE
BITUMINOUS CONCRETE ★ STEEL
ASPHALT ★ AGGREGATES ★ EMULSIONS
POZZOLANIC MATERIALS ★ LIME

WHITNEY & ASSOCIATES
INCORPORATED
2406 West Nebraska Avenue
PEORIA, ILLINOIS 61604-3193

TELEFAX
309-673-3050
GEOTECHNICAL ENGINEERING
CONSTRUCTION QUALITY CONTROL
SUBSURFACE EXPLORATIONS
ENVIRONMENTAL INVESTIGATIONS
★ ★ ★ ★ ★ ★ ★ ★ ★ ★
MONITORING WELL INSTALLATIONS
BUILT-UP ROOF INVESTIGATIONS
WELDER CERTIFICATIONS
INSURANCE INVESTIGATIONS

CLIENT:

Mr. Terry Feldmann
Maurer - Stutz, Inc.
7615 North Harker Drive
Peoria, Illinois 61615

W&A FILE NO. 4660001
DATE: 08-22-08

1305 002440

PROJECT:

Tradition South Dairy – 238-070260
Site Investigation
Nora, Illinois

ATTERBERG LIMITS TEST RESULTS

SAMPLE NUMBER	P-17
SAMPLE ELEVATION	970±
SOIL CLASSIFICATION	Brown LEAN CLAY - CL
LIQUID LIMIT-%	39.7
PLASTIC LIMIT-%	22.4
PLASTICITY INDEX-%	17.3

Should you have any questions or comments whatsoever in regard to these test results, or any additional information is desired, please do not hesitate to contact me personally at your convenience.

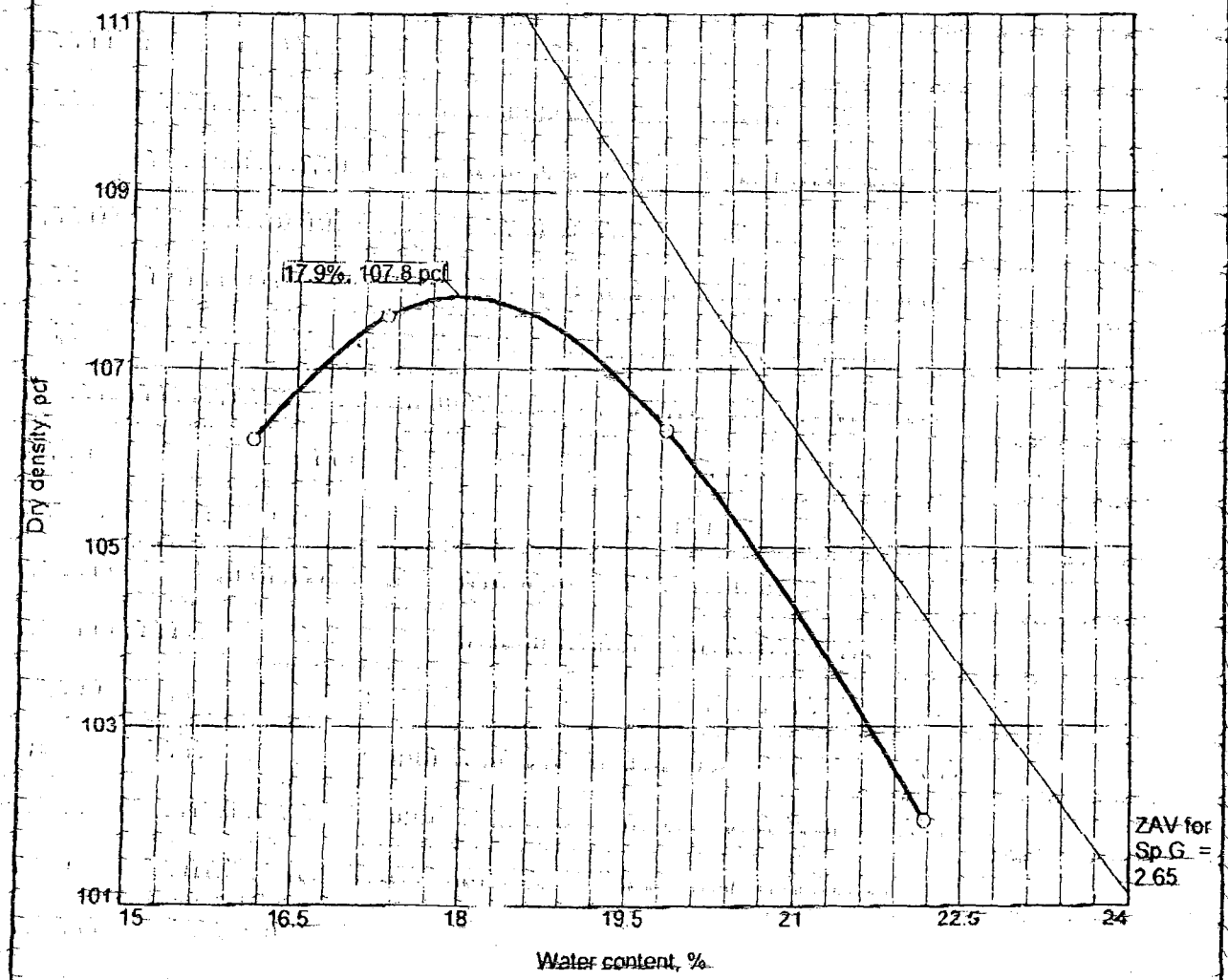
Respectfully submitted,
WHITNEY & ASSOCIATES

(By) James R. Krusemark
James R. Krusemark, P. E.

JRK:rma

B07 002462

STANDARD PROCTOR TEST REPORT



Test specification: ASTM D 698-00a Method A Standard

Elev/ Depth	Classification USCS	Classification AASHTO	Nat. Moist.	Sp.G.	LL	PI	%> #4	%< No.200
970 +/-	CL		-		39.7	17.3		

TEST RESULTS

Maximum dry density = 107.8 pcf

Optimum moisture = 17.9 %

MATERIAL DESCRIPTION

Brown LEAN CLAY CL

Project No. 4660 Client: Mr. Terry Feldman Maurer Stutz, Inc

Project: TRADITION SOUTH DAIRY

Nora, Illinois Date: 9-5-08

Location: Pit P-17 Depth: 970 +/-

Remarks:

WHITNEY & ASSOCIATES
PEORIA, ILLINOIS
www.whitneyassociates.com

Figure P-1

B07 002480

PERMEABILITY TEST REPORT

Pond bottom

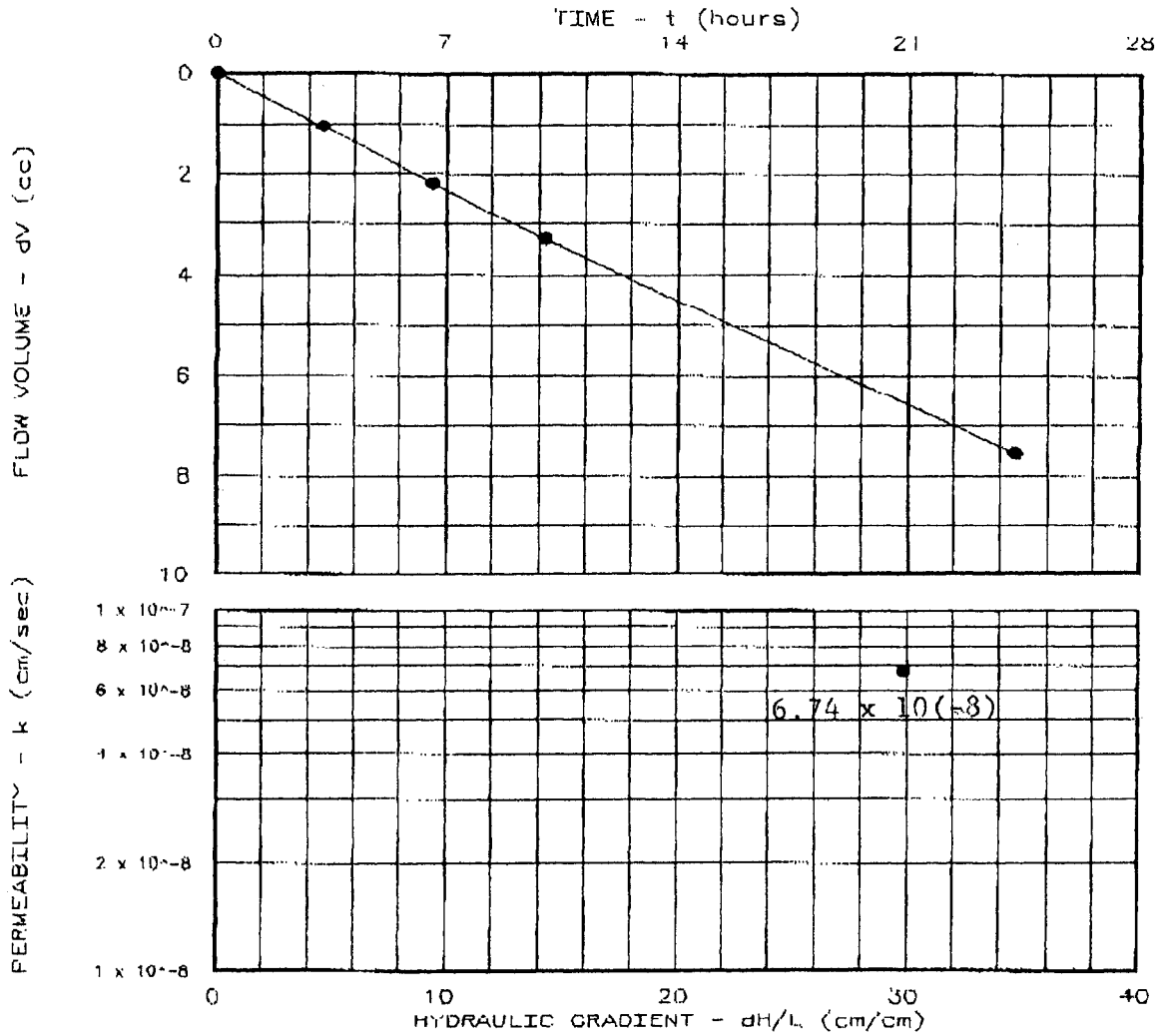
TEST DATA:

Specimen Height (cm): 7.61
Specimen Diameter (cm): 7.24
Dry Unit Weight (pcf): 102.6
Moisture Before Test (%): 19.1
Moisture After Test (%): 22.8
Run Number: 1 ● 2 ▲
Cell Pressure (psi): 11.0
Test Pressure (psi): 8.0
Back Pressure (psi): 4.8
Diff. Head (psi): 3.2
Flow Rate (cc/sec): 8.62 x 10^-5
Perm. (cm/sec): 6.74 x 10^-8

SAMPLE DATA:

Sample Identification: Proposed Liner Material (Test Pit P-17: 970 +/-)
Visual Description: Brown LEAN CLAY

Remarks: ASTM D-5084 & IEPA Test Procedures
Maximum Dry Density (pcf): 107.8
Optimum Moisture Content (%): 17.9 ASTM(D-698)
Percent Compaction: 95.2%
Permeameter type: B-K Flexwall
Sample type: 3" Remolded



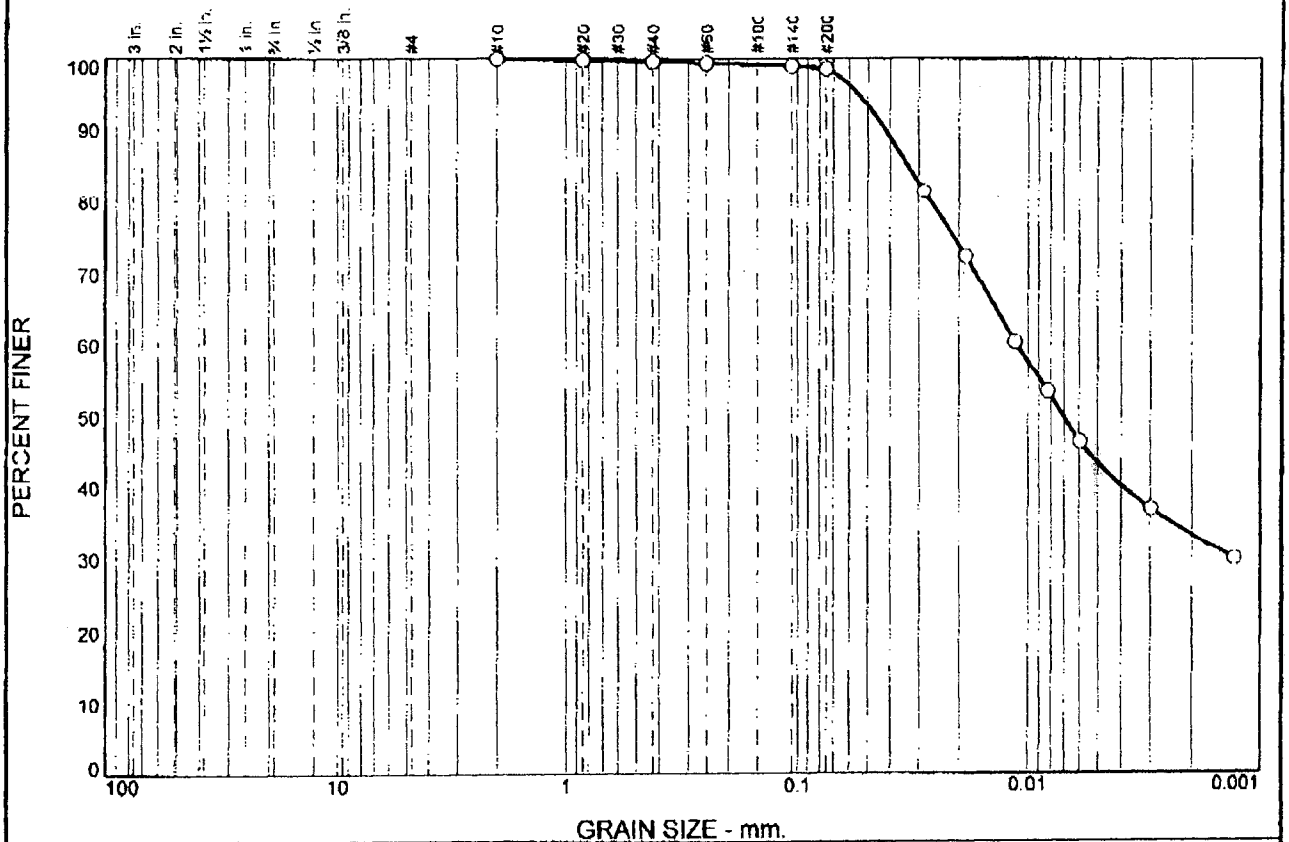
Project: TRADITION SOUTH DAIRY INVESTIGATION
Location: Nora, Illinois
Date: 10-3-08

PERMEABILITY TEST REPORT

WHITNEY & ASSOCIATES

Project No.: MSI-1
File No.: 1165
Lab No.: 4
Tested by: JRK
Checked by: JRK
Test: CH - Constant head

Grain Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.4	1.0	55.3	43.3

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#20	99.8		
#40	99.6		
#60	99.4		
#140	99.0		
#200	98.6		

* (no specification provided)

Material Description

Brown, LEAN CLAY CL

Atterberg Limits

PL= LL= 39.7 PI= 17.3

Coefficients

D_{90}= 0.0420 D_{85}= 0.0334 D_{60}= 0.0111
D_{50}= 0.0071 D_{30}= 0.0013 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO=

Remarks

Location: Pit P-17
Depth: 970 +/-

Date: 10-1-08

WHITNEY & ASSOCIATES
PEORIA, ILLINOIS
www.whitneyassociates.com

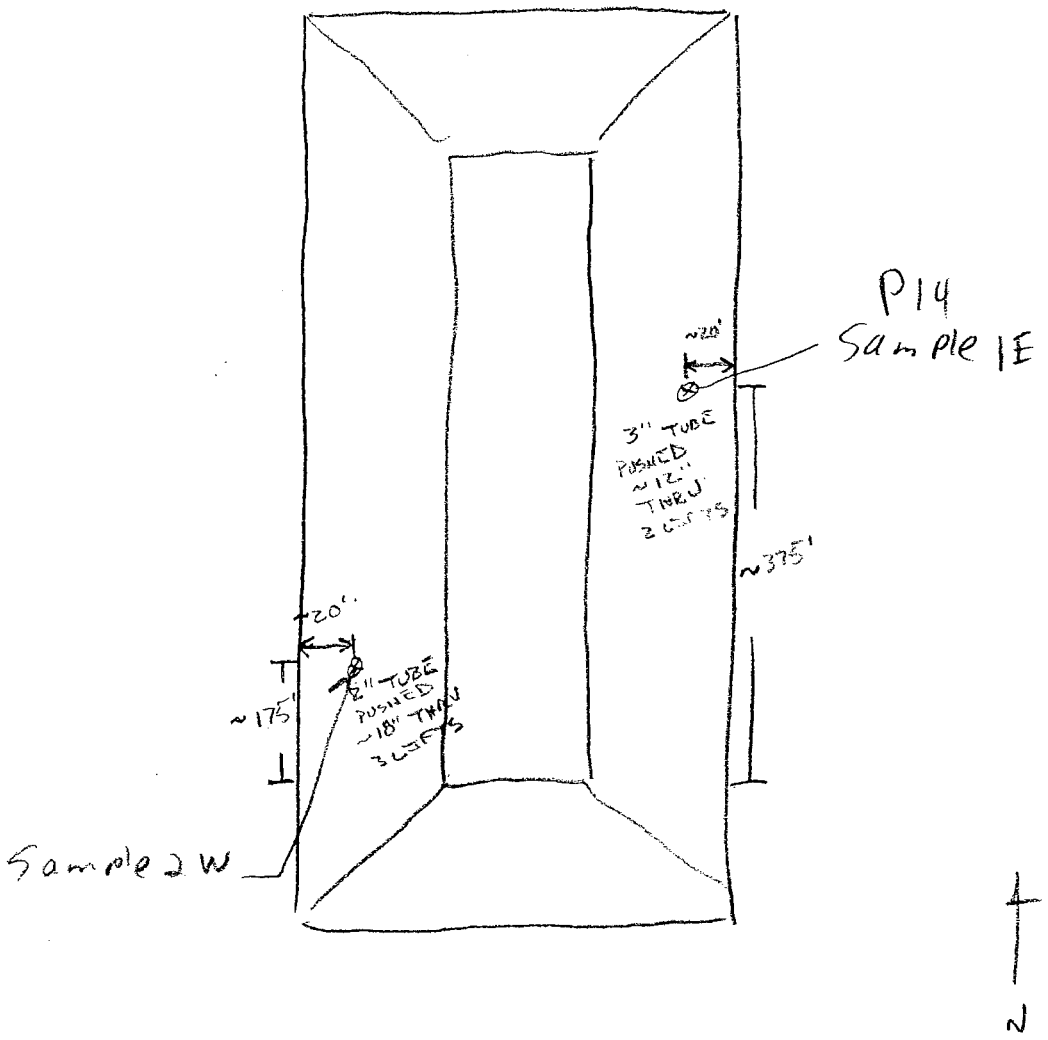
Client: Mr. Terry Feldman Maurer Stutz, Inc
Project: TRADITION SOUTH DAIRY
Nora, Illinois
Project No: 4660 **Figure** GS-1

MAURER ▲ STUTZ, INC.
ENGINEERS SURVEYORS

PROJECT: Tradition South
PROJECT NO.: 238-070266
COMPUTATION BY: AKO DATE: 10-18-08 SH. NO. 1
CHECKED BY: TLF DATE: 10-20-08 OF 1

SUBJECT: SHEET TUBE LOCATIONS

BOS 002499



002500

PERMEABILITY TEST REPORT

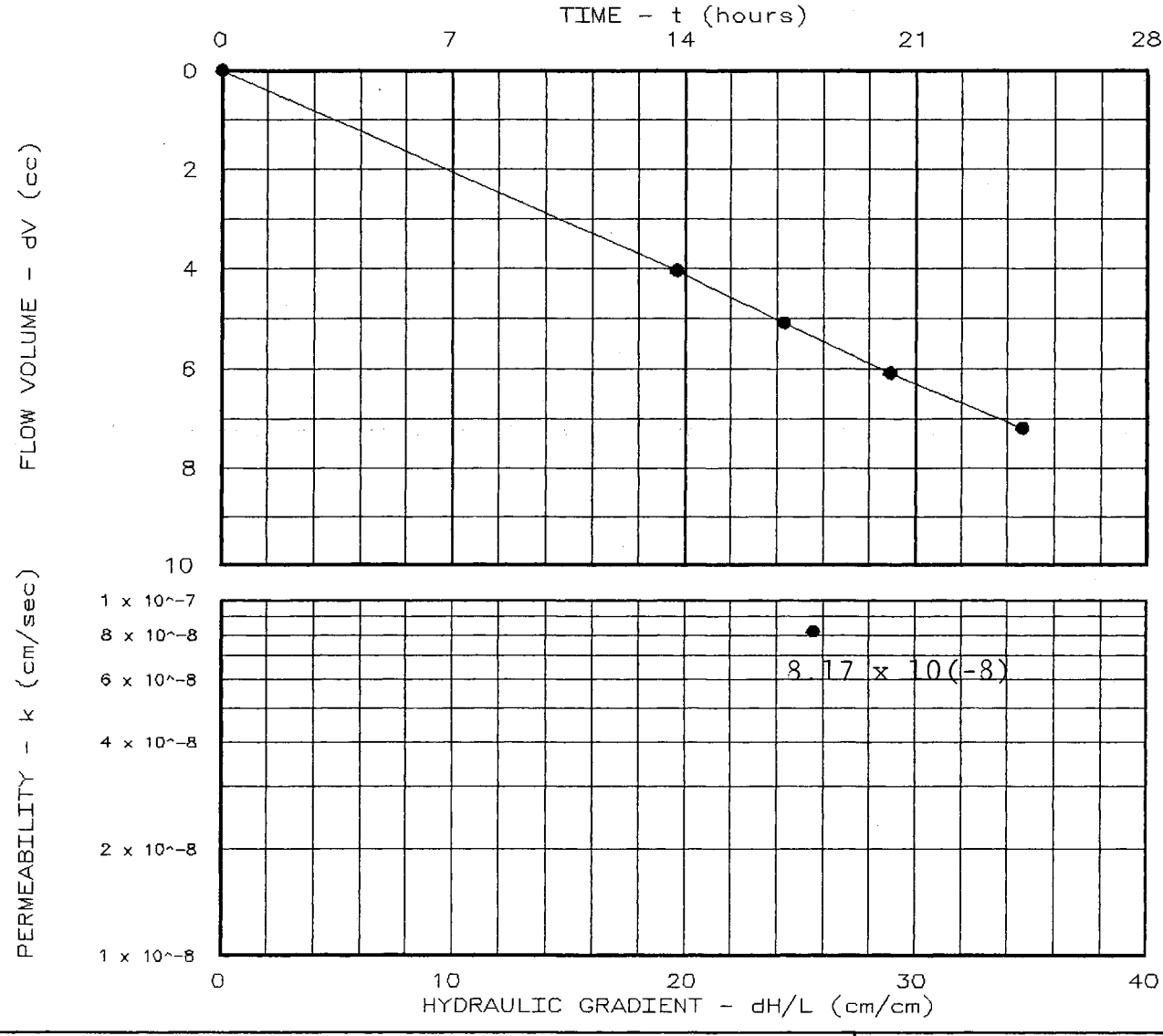
TEST DATA:

Specimen Height (cm): 8.00
Specimen Diameter (cm): 7.11
Dry Unit Weight (pcf): 103.8
Moisture Before Test (%): 20.1
Moisture After Test (%): 22.4

Run Number:	1 ●	2 ▲
Cell Pressure (psi):	11.0	
Test Pressure (psi):	8.0	
Back Pressure (psi):	5.1	
Diff. Head (psi):	2.9	
Flow Rate (cc/sec):	8.30 x 10^-5	
Perm. (cm/sec):	8.17 x 10^-8	

SAMPLE DATA:

Sample Identification: Liner Material
East Slope - Upper Lift
Visual Description: Gr. Brown & Dk. Brown
LEAN CLAY CL
Remarks: ASTM D-5084 & IEPA
Test Procedures
Maximum Dry Density (pcf): 107.8
Optimum Moisture Content (%): 17.9
ASTM(D-698)
Percent Compaction: 96.3%
Permeameter type: B-K Flexwall
Sample type: 3" S.T.



Project: TRADITION SOUTH DAIRY INVESTIGATION
Location: Nora, Illinois
Date: 11-4-08

PERMEABILITY TEST REPORT

WHITNEY & ASSOCIATES

Project No.: MSI-2
File No.: 1166
Lab No.: 4
Tested by: JRK
Checked by: JRK
Test: CH - Constant head

002501

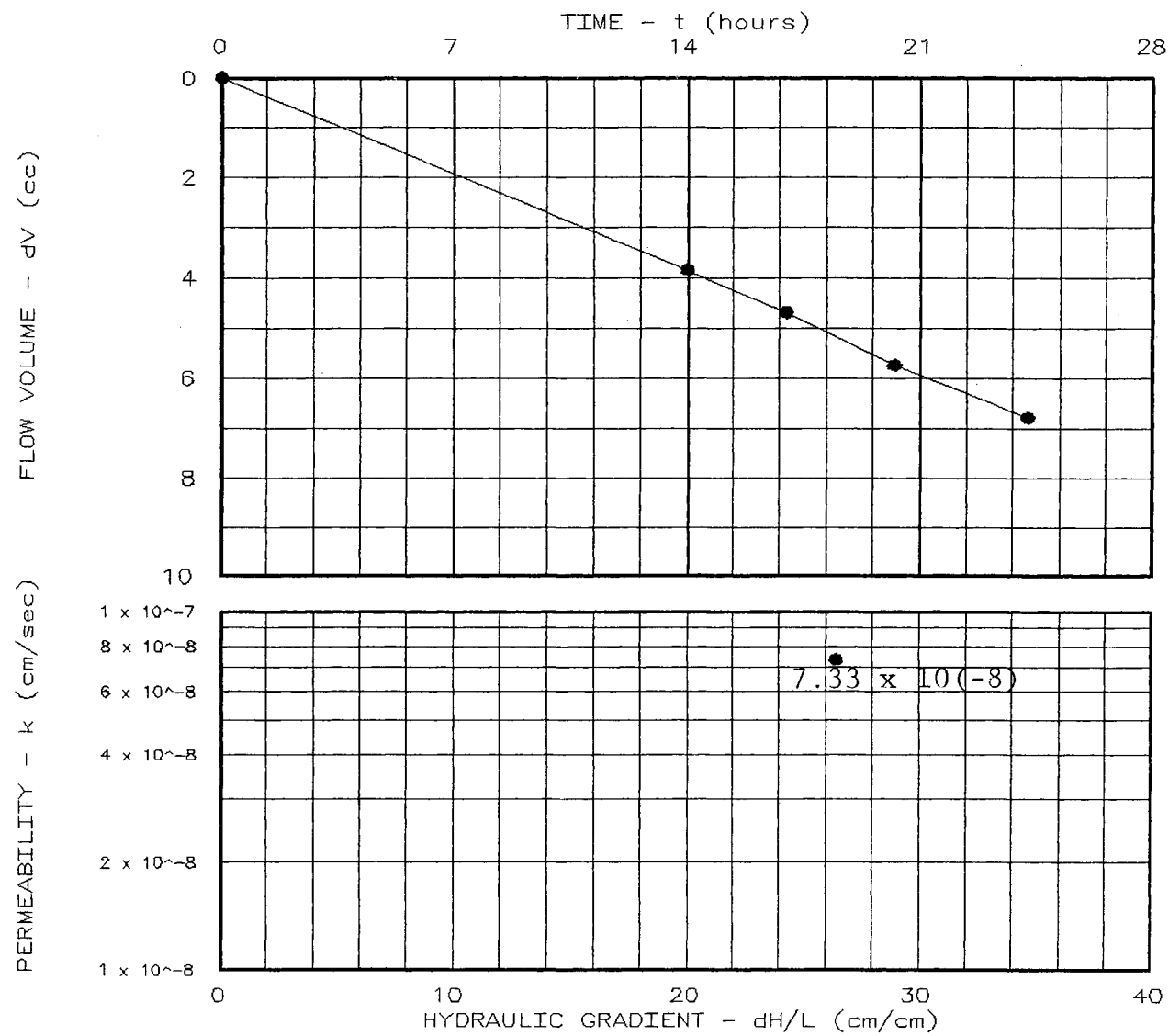
PERMEABILITY TEST REPORT

TEST DATA:

Specimen Height (cm): 7.93
Specimen Diameter (cm): 7.16
Dry Unit Weight (pcf): 104.7
Moisture Before Test (%): 18.7
Moisture After Test (%): 20.9
Run Number: 1 ● 2 ▲
Cell Pressure (psi): 11.0
Test Pressure (psi): 8.0
Back Pressure (psi): 5.0
Diff. Head (psi): 3.0
Flow Rate (cc/sec): 7.82 x 10^-5
Perm. (cm/sec): 7.33 x 10^-8

SAMPLE DATA:

Sample Identification: Liner Material
East Slope - Lower Lift
Visual Description: Lt. Brown & Dk. Brown
LEAN CLAY CL
Remarks: ASTM D-5084 & IEPA
Test Procedures
Maximum Dry Density (pcf): 107.8
Optimum Moisture Content (%): 17.9
ASTM(D-698)
Percent Compaction: 97.1%
Permeameter type: B-K Flexwall
Sample type: 3" S.T.



Project: TRADITION SOUTH DAIRY INVESTIGATION
Location: Nora, Illinois
Date: 11-4-08

PERMEABILITY TEST REPORT

WHITNEY & ASSOCIATES

Project No.: MSI-3
File No.: 1167
Lab No.: 5
Tested by: JRK
Checked by: JRK
Test: CH - Constant head

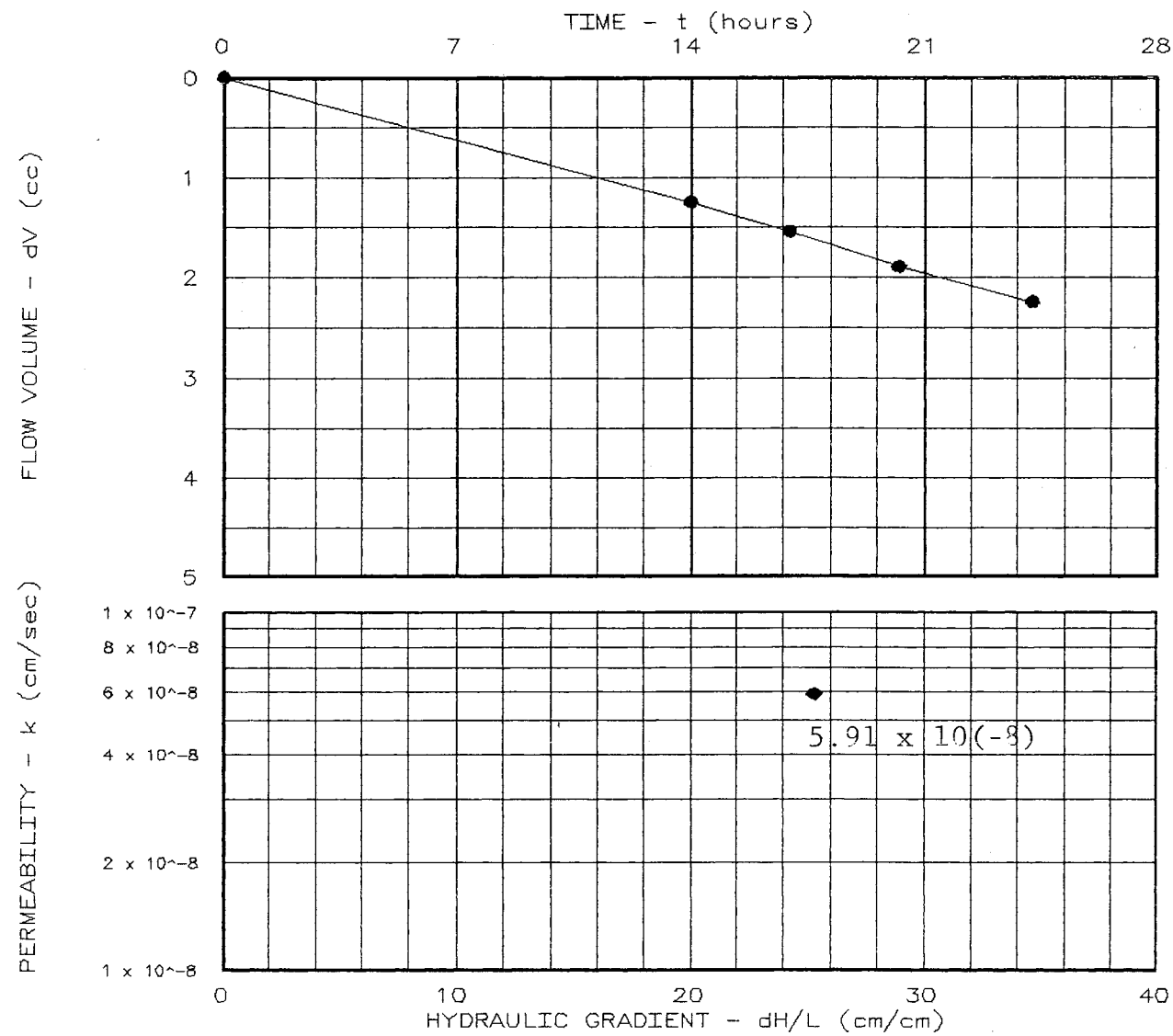
PERMEABILITY TEST REPORT

TEST DATA:

Specimen Height (cm): 5.41
Specimen Diameter (cm): 4.69
Dry Unit Weight (pcf): 103.7
Moisture Before Test (%): 21.2
Moisture After Test (%): 22.8
Run Number: 1 ● 2 ▲
Cell Pressure (psi): 10.0
Test Pressure (psi): 7.0
Back Pressure (psi): 5.1
Diff. Head (psi): 1.9
Flow Rate (cc/sec): 2.59 x 10^-5
Perm. (cm/sec): 5.91 x 10^-8

SAMPLE DATA:

Sample Identification: Liner Material
West Slope - Upper Lift
Visual Description: Gr. Brown & Dk. Brown
FAT CLAY CH
Remarks: ASTM D-5084 & IEPA
Test Procedures
Maximum Dry Density (pcf): 107.8
Optimum Moisture Content (%): 17.9
ASTM(D-698)
Percent Compaction: 96.2%
Permeameter type: B-K Flexwall
Sample type: (3") 2" S.T.



Project: TRADITION SOUTH DAIRY INVESTIGATION
Location: Nora, Illinois
Date: 11-4-08

PERMEABILITY TEST REPORT

WHITNEY & ASSOCIATES

Project No.: MSI-4
File No.: 1168
Lab No.: a
Tested by: JRK
Checked by: JRK
Test: CH - Constant head

TO BE REVIEWED AND REVISED
UPON COMPLETION OF CONSTRUCTION

OPERATION AND MAINTENANCE PLAN

Facility: Tradition South Dairy Date: April 26, 2010

Address: 12521 East Mahoney Road, Warren, IL 61087

Location: SEC 06 T 28 N R 5 E PM 4th

WASTE STORAGE FACILITIES AND MANURE TRANSFER SYSTEM

LIQUID FLOWS

Manure will be collected in the reinforced concrete tanks P27 & P28 and shall be removed by agitation and pumps.

The earthen holding ponds P14, P16 and P17 are designed to handle 12 months of process wastewater and manure from the production area. The maximum annual liquid level leaves 2' of freeboard plus 0.61 ft for the 25 year-24 hour storm event. A staff gage is required to be installed and will have designations for the level at which pumping must start. The maximum liquid level-start pump down elevation is 988.8 ft which is the bottom of the 2' freeboard requirement. Six pump/agitation ramp sump areas are located in each holding pond and protect the liner during agitation.

During normal years, the waste is to be applied by injection or incorporation to surrounding cropland according to the facility's Nutrient Management Plan. On average approximately 54.09 million gallons of liquid manure will be land applied annually. During extreme years of precipitation, the amount of liquid manure could increase to 62.3 million gallons annually. If using pumps that operate at a combine average 3000 gallons/minute, the estimated time of pumping during normal years is 304 hours and 346 hours during extreme years. While the evaporation volume would typically increase with an increase in precipitation, these numbers are to provide guidance and an understanding of the basis for facility design, required management, and operation. Field application may be performed during late spring, summer, and early fall, preferably between May and November.

Pumping/Agitation ramps or rip rap base are located in six (6) places locations around each holding pond for pumping from the holding ponds to prevent damage of the berm and liner. Samples of the wastewater from the holding ponds shall be analyzed for nutrients (TKN, NH3-N, P, K) in order to calculate rates and properly apply the waste on agricultural farm ground.

Solids/Slurry

The concrete stacking and bedding pack areas are designed to store 180 days of manure and bedding waste.

During normal years when separated solids are used for bedding and extra solids are sold, the solid manure volume will be applied by surface application using spreading equipment and then incorporated according to the Nutrient Management Plan provisions. The surrounding

cropland will receive an average of 1100 tons of solid manure annually. Based on using a manure spreader or side slinger that can haul 400 bushels/load at 3 loads/hour, the estimated time of hauling during a normal year is 30 hours. These numbers are meant to provide guidance and an understanding of the basis for facility design, required management, and operation. Field application shall be planned for at least one a year during late spring, summer, and early fall, preferably between May and November.

Follow the Nutrient Management Plan for land application and offsite transfer requirements. Facility management is critical in determining the proper times to apply solid waste and to ensure that the stacking area retains its available capacity for waste.

TO BE REVIEWED AND REVISED
UPON COMPLETION OF CONSTRUCTION

OPERATIONAL RECOMMENDATIONS

Earthen Structures

(Manure Pits/Ponds)

Holding Pond – P14

- Start pumping to remove manure and wastewater before liquid level reaches the "Start Pumping" elevation indicated on the staff gauge at elevation 988.8' (i.e., the maximum operation level).
- Liquid waste shall be removed by pumping and utilized on cropland as part of an overall nutrient management plan.
- Agitation shall be used as needed for solids removal.
- Pumping / Agitation events shall take place a one of the six concrete pump/agitation ramps located around the waste storage facility.
- Solid waste shall be removed and utilized on cropland as part of an overall nutrient management plan except a layer of floating solids/bio-cover, which can remain.
- During an average year, 4,200,000 gallons of liquid manure will be produced in waste storage pond P14. At a rate of 1000 GPM, it will take approximately 53 hours/yr to pump liquid wastes.
- The liquid surface elevation shown on the staff gauge shall be recorded a minimum of once every week for CAFOs or facilities subject to the Illinois Department of Agriculture LMFAct regulations.
- The top 2.0 feet of the holding pond is designated for freeboard (i.e., emergency precipitation events only).

TO BE REVIEWED AND REVISED
UPON COMPLETION OF CONSTRUCTION

Holding Pond – P16

- Start pumping to remove manure and wastewater before liquid level reaches the "Start Pumping" elevation indicated on the staff gauge at elevation 988.8' (i.e., the maximum operation level).
- Waste shall be removed by pumping and utilized on cropland as part of an overall nutrient management plan.
- Agitation shall be used as needed for solids removal.
- Pumping / Agitation events shall take place a one of the six concrete pump/agitation ramps located around the waste storage facility.
- During an average year, 26,000,000 gallons of liquid manure will be produced in waste storage pond P16. At a rate of 3000 GPM, it will take approximately 144 hours/yr to pump liquid wastes.
- The liquid surface elevation shown on the staff gauge shall be recorded on a regular basis (a minimum of once every week) for CAFO facilities or if subject to the Illinois Department of Agriculture LMFAct regulations.
- The top 2 feet of the holding pond is designated for freeboard (i.e., emergency precipitation events only).

Holding Pond – P17

- Start pumping to remove manure and wastewater before liquid level reaches the "Start Pumping" elevation indicated on the staff gauge at elevation 988.8' (i.e., the maximum operation level).
- Waste shall be removed by pumping and utilized on cropland as part of an overall nutrient management plan.
- Agitation shall be used as needed for solids removal.
- Pumping / Agitation events shall take place a one of the six concrete pump/agitation ramps located around the waste storage facility.
- During an average year, 25,000,000 gallons of liquid manure will be produced. At a rate of 3000 GPM, it will take approximately 139 hours/yr to pump liquid wastes.
- The liquid surface elevation shown on the staff gauge shall be recorded on a regular basis (a minimum of once every week) for CAFO s or facilities subject to the Illinois Department of Agriculture LMFAct regulations.
- The top 2 feet of the holding pond is designated for freeboard (i.e., emergency precipitation events only).

TO BE REVIEWED AND REVISED
UPON COMPLETION OF CONSTRUCTION

Concrete Structures

(Tanks/Reception Pits/Lift Stations/Digester)

Reception Tank – P27

- Top of Tank Elevation 991.3'
- High Water Alarm Stage 14.0 ft (EL=989.3')
- Flush Pumps
  - Stop pumping when liquid level reaches the "Stop Pumping" stage at 3.5 ft (EL=978.8') (i.e., the minimum operation level).
- Positive Displacement Pumps
  - Stop pumping when liquid level reaches the "Stop Pumping" stage at 3.5 ft (EL=978.8') (i.e., the minimum operation level).

Reception Tank – P28

- Top of Tank Elevation 1001.1'
- High Water Alarm Stage 11.0 ft (EL=999.4')
- Flush Pump
  - Stop pumping when liquid level reaches the "Stop Pumping" stage at 3.0 ft (EL=992.1') (i.e., the minimum operation level).
- Transfer Pump
  - Start pumping to remove manure and wastewater when liquid level reaches the "Start Pumping" stage at 9.5 ft (EL=998.6') (i.e., the maximum operation level).
  - Stop pumping when liquid level reaches the "Stop Pumping" stage at 3.0 ft (EL=992.1') (i.e., the minimum operation level).

Reception Tank/Separator Building – P25

- Top of Tank Elevation 997.0'
- High Water Alarm Stage 11.0 ft (EL=996.0')
- Transfer Pump
  - Start pumping to remove manure and wastewater when liquid level reaches the "Start Pumping" stage at 11.0 ft (EL=996.0') (i.e., the maximum operation level).
  - Stop pumping when liquid level reaches the "Stop Pumping" stage at 3.0 ft (EL=988.0') (i.e., the minimum operation level).
- Solid/Liquid Separation Equipment
  - Perform all periodic and scheduled maintenance as required and recommended by Manufacturers & Suppliers.

Digester – P23

TO BE REVIEWED AND REVISED
UPON COMPLETION OF CONSTRUCTION

- Perform all periodic and scheduled maintenance as required and recommended by Manufacturers & Suppliers.

Concrete Structures

(Solids Stack Pad/Bedding Packs)

Bedding Pack – P5

- Start hauling to remove solids before solids levels reach the top of ramp at entrance to manure stack pad (i.e., the maximum operation level).
- Waste removal shall be by scraping and hauling. Solids may be utilized on cropland as part of an overall nutrient management plan.

Separated Solids Stacking Pad – P24

- Start hauling to remove solids before solids levels reach the top of ramp at entrance to manure stack pad (i.e., the maximum operation level).
- Waste removal shall be by scraping and hauling. Solids may be utilized as bedding or sold as an offsite transfer.

TO BE REVIEWED AND REVISED
UPON COMPLETION OF CONSTRUCTION

MAINTENANCE - GENERAL RECOMMENDATIONS

Waste Storage Facilities

- All pipes, pumps, signs, embankments, weir boards, measuring devices, and concrete structures associated with the waste handling system shall be inspected at regular intervals and kept in good repair.
- Written documentation of observations and any maintenance performed should be kept in the facility maintenance log/records.
- Embankments slopes and a strip (20 foot, min.) adjacent to the toe shall be kept in permanent grass. The grass should be mowed and kept in good condition.
- Check sideslopes for erosion problems. If erosion is a problem, stone protection may need to be added.
- Check the outside earthen embankment for holes or slippage. Burrowing animals should not be allowed to establish dens in the embankment. Fill any holes located in the embankment.

Earthen Structures (Manure Pit/Pond)

- Earthen slopes shall be checked for rills and gullies. Seeding shall be as necessary to maintain a permanent grass cover. Weeds shall be controlled. The top of dam and outside slopes shall be mowed to discourage weed growth and allow closer examination of the earth embankment. Quickly remove woody vegetation that begins to grow on the embankment to prevent root establishment on the inside slopes. Broadleaf herbicide may be used.
- Earthen slopes shall be checked for soft or damp/wet areas that may be a sign of potential leakage.
- Burrowing animals in the slopes shall be controlled. Animals shall be immediately removed and the burrow holes filled.
- Fencing/gates shall be maintained around the structure to exclude animals and humans at all times.
- Safety equipment (life buoys, ropes) and warning signs shall be maintained and checked periodically for wear.
- High traffic areas, such as pump access areas, should be lined with aggregate or concrete if vegetative cover cannot be maintained.
- Remove any debris that may accumulate in or immediately upstream of the containments.
- Immediately repair any vandalism, vehicular, or livestock damage to any earth fills, spillways, or outlets.

TO BE REVIEWED AND REVISED
UPON COMPLETION OF CONSTRUCTION

- Determine and eliminate causes of settlement or cracks in the earthen sections and repair damage.
- Replace weathered or displaced rock riprap to designed/constructed grade.
- Inspect the compacted clay liner for signs of damage from rodents or animals, machinery or desiccation.

COMPACTED CLAY LINERS

- If the liner is damaged by rodents, animals or machinery, a sufficient portion of the liner to allow compaction by manually directed power tamper(s) shall be removed to an undamaged depth and replaced as directed by a qualified engineer.
- Agitation and pumping shall only be performed where concrete ramps and pads allow for those activities without disturbing the liner.
- Desiccation may cause cracks to form in the liner above static liquid levels in extremely dry and warm weather periods. Maintain protective soil layer on top of clay liner (e.g. Topsoil). Topsoil shall maintain permanent grass vegetation on the top 10 feet of slope length. To prevent desiccation cracking, use sprinkler irrigation to periodically wet the exposed liner surfaces with liquids from the ponds during summer and early fall, as necessary.
- Allow manure solids to accumulate on the liner surfaces as liquid levels in the pond fluctuate.
- Control Vegetation (e.g. Weeds) on exposed liner surfaces by raising the liquid level to drown the vegetation or by use of acceptable weed control herbicides.
- Maintain concrete slabs below influent pipes to protect liner from erosion.

Concrete Structures

(Tanks/Reception Pits/Lift Stations/Digester)

- Follow your nutrient management plan.
- Inspect after significant storm events and at least weekly, to identify repair and maintenance needs.
- The outside above ground portions of the tanks shall be periodically checked for concrete deterioration and cracks. Cracks that open up less than 0.1 inch should be monitored and can be filled with elastomeric joint sealant. A structural engineer should investigate cracks that open further or begin to move laterally.
- Monitor the manure elevation in the tank at least weekly with a flashlight. Immediately investigate any unexpected level changes. Manure level decreases indicate tank leakage. Manure level increases could indicate ground or surface water inflow, or excessive waterer leaks

TO BE REVIEWED AND REVISED
UPON COMPLETION OF CONSTRUCTION

- Maintain at least 1 foot of clearance between the manure level and bottom of lid to maintain tank ventilation and prevent overflow of manure
- Keep out any foreign materials that cannot be pumped or agitated.
- Do not allow hypodermic needles, medicine packaging, veterinarian supplies, etc. to drop through lid into storage.
- Do not store or dispose of animal mortality, greases, syringes, or other non-livestock manure wastes in the tank/pit.
- Inspect concrete and wood walls, concrete floors, concrete lids, and roofs often for separations and/or cracks, which would indicate potential failure. Repairs should be made immediately. A thorough inspection should be made each time the tank/pit is emptied.
- Inspect haul roads and approaches to and from the tank/pit frequently to determine the need for stone or other stabilizing materials.
- All gates should be inspected periodically (minimum of two times per year) to make sure they are functional, structurally sound, and are not cracked, broken, and/or a safety hazard to the operator or the animals.
- Earth embankments should be mowed 2 times per year. A good vegetative cover should be maintained on earth embankments. If the vegetative cover is damaged, embankments should be re-vegetated as soon as possible.
- When accessible to children or livestock, the facility should be gated or fenced. All fences and gates shall be inspected for damage at least twice a year. Damaged fences and gates should be repaired or replaced as soon as possible.
- Check frequently for burrowing animals. When found, remove the burrowing animals, replace embankment materials and reseed.
- Tanks should be thoroughly agitated before and during pumping to prevent solids buildup and to provide a consistent product for transfer thru the waste transfer system. Solids buildup should be limited to 6 inches or less.

Concrete Structures

(Solids Stack Pad/Bedding Packs)

- Follow your nutrient management plan.
- Inspect after significant storm events and at least weekly, to identify repair and maintenance needs.

TO BE REVIEWED AND REVISED
UPON COMPLETION OF CONSTRUCTION

- The outside above ground portions of the stacks shall be periodically checked for concrete deterioration and cracks. Cracks that open up less than 0.1 inch should be monitored and can be filled with elastomeric joint sealant. A structural engineer should investigate cracks that open further or begin to move laterally.
- Do not allow hypodermic needles, medicine packaging, veterinarian supplies, etc. to drop through lid into storage.
- Do not store or dispose of animal mortality, greases, syringes, or other non-livestock manure wastes in the tank/pit.
- Inspect concrete and wood walls, concrete floors, concrete lids, and roofs often for separations and/or cracks, which would indicate potential failure. Repairs should be made immediately. A thorough inspection should be made each time the tank/pit is emptied.
- Inspect haul roads and approaches to and from the tank/pit frequently to determine the need for stone or other stabilizing materials.
- All gates should be inspected periodically (minimum of two times per year) to make sure they are functional, structurally sound, and are not cracked, broken, and/or a safety hazard to the operator or the animals.
- Earth embankments should be mowed 2 times per year. A good vegetative cover should be maintained on earth embankments. If the vegetative cover is damaged, embankments should be re-vegetated as soon as possible.
- When accessible to children or livestock, the facility should be gated or fenced. All fences and gates shall be inspected for damage at least twice a year. Damaged fences and gates should be repaired or replaced as soon as possible.
- Check frequently for burrowing animals. When found, remove the burrowing animals, replace embankment materials and reseed.

Manure Transfer

- The outside of above ground facilities shall be periodically checked for concrete deterioration. Each time the facilities are emptied, a check of the inside walls shall be made. All cracks and holes shall be immediately filled with a non-shrink grout material. All joints shall be examined and re-sealed as necessary.
- Manure Transfer Systems - For a liquid transfer system, manure is considered "too dry" or "frozen" when the material can be stacked or will not visibly flow as a slurry or liquid.
- To prevent plugging in pipe transfer systems:

TO BE REVIEWED AND REVISED
UPON COMPLETION OF CONSTRUCTION

- Dry, dense "clumps" of manure/ bedding or frozen manure shall not be placed in the reception pit/pipe. Frozen manure shall be allowed to thaw before placing in the transfer pipe. Water shall be added to dry material.
- Care shall be given to avoid foreign objects such as wood, concrete or metal entering the system.
- Changes made in the type of bedding materials originally proposed for the system may result in plugging or blockage of the transfer system. A change to sand bedding will almost certainly cause a sand buildup at the outlet and plug the transfer pipe. Please contact the design engineer or NRCS/SWCD office for planning assistance if you are considering a switch to sand bedding in a system not initially designed for sand.
- Each time the system is emptied, the following shall be checked:
  - Condition of the reception tank. Look for deterioration of the tank material. Examine the connection area of the tank and transfer pipe. If an additional pipe enters the tank (milkhouse line), check for any blockages.
  - Condition of the transfer pipes. Look for low areas or blowholes over the pipe for signs of pipe joint problems.
- For push off ramps/piers, all traffic barriers/guards shall be maintained in good condition. Safety barriers/guards/grates shall be maintained around reception tanks. Components showing wear shall be immediately replaced.

Pipelines

- Perform all periodic and scheduled maintenance as required and recommended by valve and pipe Manufacturers & Suppliers.
- Make sure all valves and air vents are in and set at the operating condition to provide protection for the pipeline.
- Maintain all screens and filters in good working condition and promptly repair or replace.
- Maintain the design depth of cover over the pipeline.
- Limit traffic over the pipeline to designated sections that were designed for traffic loads.
- Avoid travel over pipelines by tillage equipment when the soil is saturated.
- Avoid any subsoiling operation that may disturb the pipeline.
- Remove all foreign debris that hinders system operation.
- Drain all system components in areas that are subject to freezing. If parts of the system cannot be drained, an anti-freeze solution shall be added.
- If the pipeline is connected to a continuous flowing source, such as a spring, maintain flow through the pipe to avoid freezing.
- Eradicate or otherwise remove all rodents or burrowing animals. Immediately repair any

damage caused by their activity.

- Immediately repair any vandalism, vehicular, or livestock damage to any outlets and appurtenances.

Pumps and Other Ancillary Components

- Perform all periodic and scheduled maintenance as required and recommended by Manufacturers & Suppliers.

TO BE REVIEWED AND REVISED
UPON COMPLETION OF CONSTRUCTION

SAFETY RECOMMENDATIONS

Safety around and maintenance of manure storages is of primary importance. All employees should be aware of the dangers associated with handling manure and working the facility. Employees should be fully trained on systems operations. The following practices and activities should be implemented at all waste storage and treatment structures.

- Place fence around the perimeter of the holding pond. Fence materials and installation shall meet the standards of NRCS 382.
- Post warning signs "KEEP OUT -- AUTHORIZED PERSONNEL" and "DANGER -- MANURE STORAGE" at least at every pit pump out and at the lift station and other conspicuous places around the facility (e.g. Fence). Signs shall meet the standards of ASAE S441.3.
- Install at least one life saving station. As a minimum, the station should contain a United States Coast Guard approved circular ring buoy on a line and a reaching pole.
- Safety equipment (ropes, ladders) shall be maintained and checked periodically for wear. Any safety shields or grates over the opening and warning signs shall be maintained in good condition and kept in place.
- Post fire department and EMS phone numbers near all telephones.
- Locate first aid equipment near the holding pond area in a clearly marked closet or box.
- Keep all guards and safety shields in place around pumps, wagons, housings, and power units.
- Keep pumping ports covered when not in use to prevent accidental or unauthorized access.
- All portals and pumping openings shall be covered and locked to keep animals and humans from entering the tank.
- Never enter the tank for any reason due to the presence of lethal gases. If inspection and/or repair of the interior of the tank is necessary, engage the services of trained and certified professionals
- Familiarize all farm personnel with the proper operation and safety precautions associated with working around the manure storage and/or treatment lagoon system.

SITE INVESTIGATION REPORT FOR
Tradition South Dairy Facility
Exemption (b)(6), Tradition Family Dairies

Location: T.28N R.5E SECTION 6, 4th PM

A Site Investigation was performed pursuant to 35 IAC 506.302. On December 4, 2007 a soils investigation was conducted by *Terracon Consultants, Inc.* at the direction of Terry Feldmann, P.E. The purpose of this soils investigation and overall site investigation was to determine the design requirements for a dairy facility as follows:

1. Determine if aquifer material is present within 5' of the planned bottom of the livestock waste handling facility.
2. Determine if the proposed livestock waste handling facility is located within the floodway or flood fringe of a 100-year flood plain.
3. Determine if the proposed livestock waste handling facility is located within a karst area or within 400 feet of a natural depression in a karst area.
4. Determine the elevation of a seasonal high water table if present.
5. Determine the soil type, classification, and soil properties to be used for foundation design.
6. Identify liner candidate material for further testing.

100-YEAR FLOOD PLAIN

After review of the FEMA 100 year flood plain map and USGS topography map, it is clear that the proposed facility is not located within the flood way or flood fringe of a 100-year flood plain. See copy of attached maps.

SOILS INVESTIGATION

Pursuant to 35 IAC 506.302 (b) for facilities not located within an area designated as "Sink Hole Areas" on IDNR-ISGS Illinois Map 8, "*Karst Terrains and Carbonate Rocks of Illinois*" (see attached portion of the map showing the proposed facility location), at least one soil boring with continuous sampling is required to be performed within 20-feet of the livestock waste handling facility boundary and extend a minimum five (5) feet below the planned bottom of the facility to determine the presence of aquifer material or Karstified Carbonate Bedrock. Since the proposed facility is not located within an area designated as "Sink Hole Areas" on Illinois Map 8, and Karstified Carbonate Bedrock was not encountered pursuant to 35 IAC section 506.302(b), the requirements of 35 IAC 506.302(g) which state that the boring would extend a minimum of 20-feet below the planned bottom, were not included in this investigation.

The soils investigation consisted of fifteen (15) soil borings throughout different locations within and near the proposed facility that extended to various depths. Review of the boring logs (see attached) indicates that seven (7) extended to a depth of 10'-0" below existing grade, five (5) extended to a depth of 20'-0" below existing grade, and three (3) reached

refusal in bedrock at depths of 6.5', 9' and 24' below existing grades. Soils were continuously sampled and visually classified according to the Unified Soil Classification System (ASTM D2487 & D2488). In addition to recording blow counts and water table depths various soil samples were collected with both split spoon and Shelby tubes, logged and taken back to the laboratory to perform additional testing. The results of which are shown on the boring logs. See the attached grading plan drawing for the location of the borings and elevations.

The soil borings indicate that carbonate bedrock is overlain by a layer of very stiff to hard, FAT CLAY (USCS-CH) residual soil of varying thickness, overlain generally by a LEAN CLAY (USCS-CL) loess and/or CLAYEY SILT (USCS-ML/CL) loess, overlain by a FAT CLAY (USCS-CH) loess and about 1 foot of topsoil. The residual soil, being of low permeability, creates a perched water table above it. Water is therefore predominately expected to move horizontally down the slopes rather than vertically through the residual soil. This is likely the reason that subsurface field drainage tiles are located within proposed facility location. The FAT CLAY loess and FAT CLAY residual soils are both expected to provide excellent clay liner construction materials. Static Water Table elevations varied from 5.5' below grade to greater than 20'. However, season High Water Table (SHWT) depths as indicated by mottling ranged from 2.5' to 3' below grade. Due to the SHWT elevations, the holding ponds will need a perimeter drainage tile as part of the design while the barns will be above the SHWT and not require perimeter drainage.

KARST AREA DETERMINATION

In addition to reviewing water well logs, soil survey maps and USGS topography maps an on-site review and survey of the land surface was conducted within the proposed facility location by Terry Feldmann, PE, Jason Olmstead, EI and Rudy Dixon, EI, SIT under the direction of Terry Feldmann, PE. During the on-site survey and review of the land surface, evidence of Karst features such as sinkholes, large springs, disrupted land drainage or underground drainage systems associated with Karstified Carbonate Bedrock was not found. After review of IDNR-ISGS Illinois Map 8, "Karst Terrains and Carbonate Rocks of Illinois", it is clear that the site is not located within an area designated as "Sink Hole Areas" (see attached copy). Further, borings and soil sampling was performed as explained above pursuant to 35 IAC 506 SUBPART C to determine the presence of "Karstified Carbonate Bedrock." Although the soil borings and samplings found carbonate bedrock as expected, evidence of a pronounced conduit or secondary porosity due to dissolution of the rock along joints, fractures, or bedding plains was not encountered within the extent of the site investigation performed pursuant to the requirements of SUBPART C. Therefore, based on the information found in this investigation, the proposed facility is not located within a Karst Area.

AQUIFER MATERIAL DETERMINATION

The carbonate bedrock encountered within 5 feet of the planned bottom of the holding ponds is presumed to be aquifer material although no rock coring was performed to determine if the rock was fractured. However, no aquifer material was encountered within the soil above the bedrock. No aquifer material was encountered within 5' of the planned bottom of the proposed barns or other waste handling facilities.

CERTIFICATION STATEMENT

"I, the undersigned, do hereby certify to the best of my professional knowledge and judgment that the site investigation associated with the site which is the subject of this construction plan was conducted under my direction and meets all the applicable requirements of the Livestock Management Facilities Act. Furthermore, the site investigation has resulted in a finding that:

1. The uppermost aquifer material is presumed to be located within 5 feet of the lowest point of the planned bottom of the holding ponds, but not within 5' of the planned bottom of the barns and other proposed waste handling components.
2. A subsurface perimeter drainage tile is needed around the holding ponds as the seasonal high water table is above the planned bottom. However, the seasonal high water table is below the planned bottom of the barns and other components.
3. The proposed facility is not located within a Karst Area.
4. The proposed facility is not located within the floodway or flood fringe of a 100-year floodplain.

Terry Feldmann
Maurer-Stutz, Inc
7615 N. Harker Drive
Peoria, IL 616151
Ph: 309-693-7615
Fax: 309-693-7616

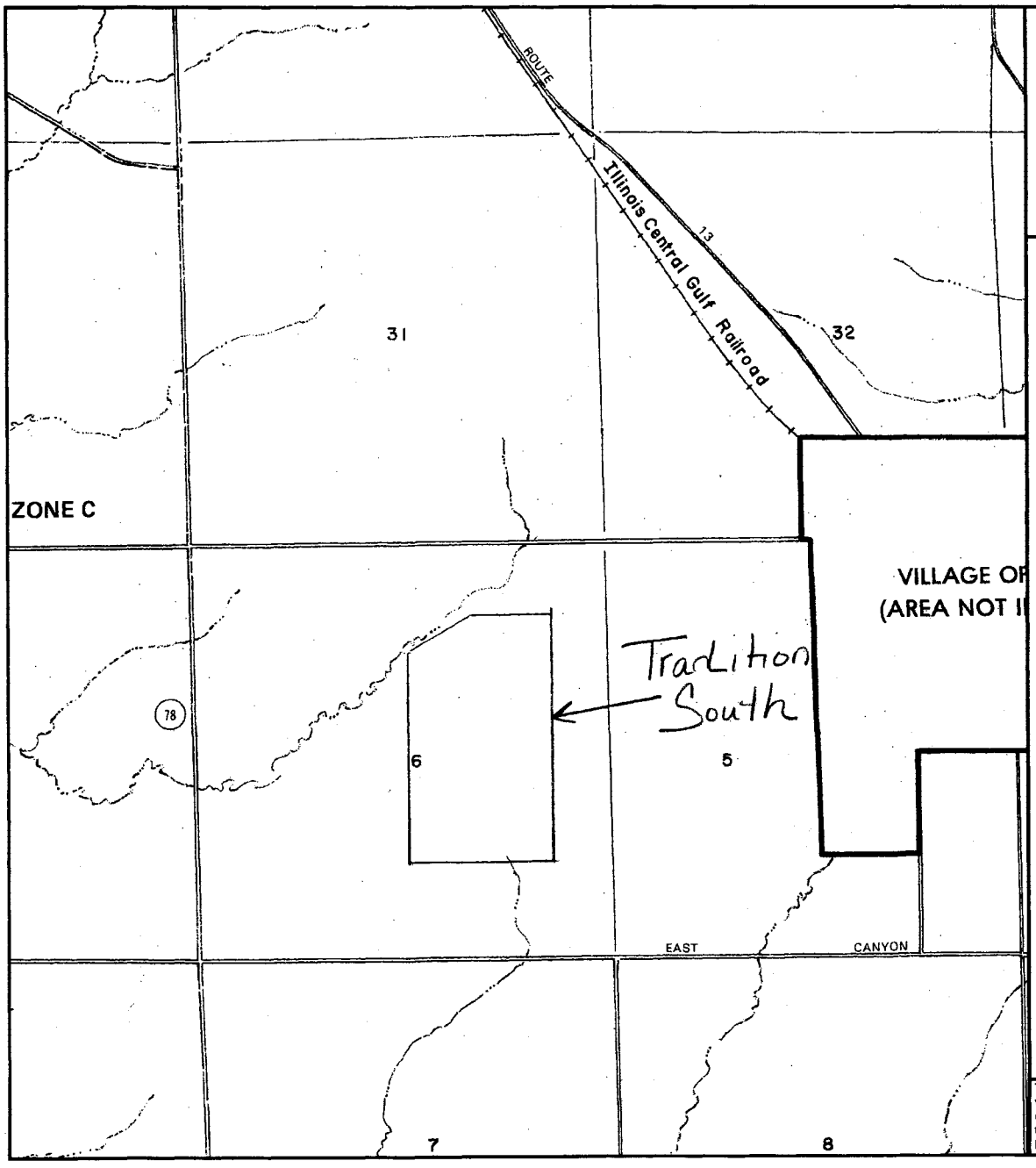
Registration # 0062-052169
Expires: 11/30/09
Stamp or Seal

SIGNATURE: Terry Feldmann

DATE : 2-14-08

Supporting justification and data relative to the findings of the site investigation are attached.
(USGS topography map, Grading Plan, boring logs, Illinois Map 8 and FEMA 100-year Floodplain map).

BAS 000353



APPROXIMATE SCALE

2000 0 2000 FEET

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

COUNTY OF
JO DAVIESS,
ILLINOIS
(UNINCORPORATED AREAS)

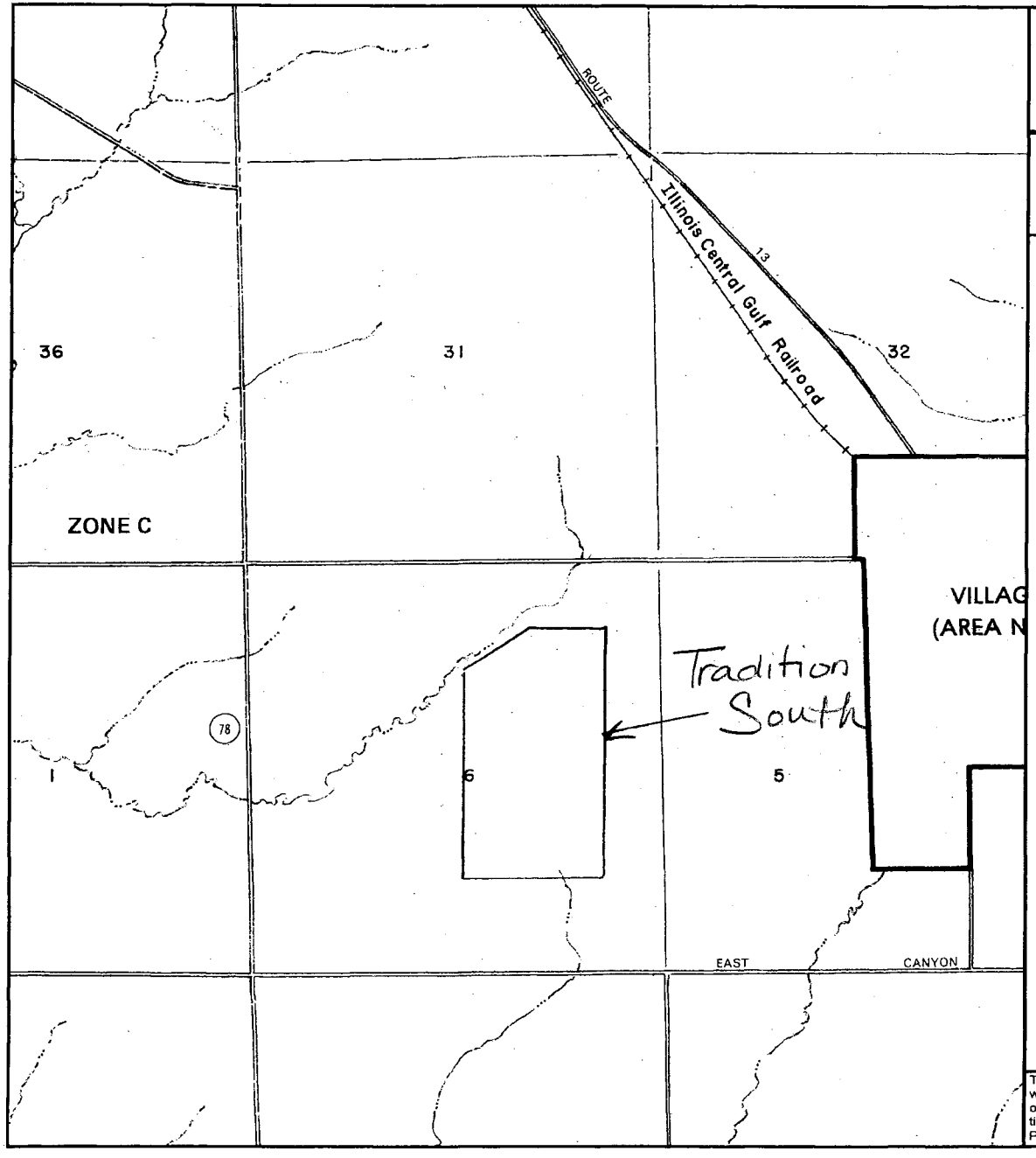
PANEL 100 OF 275

COMMUNITY-PANEL NUMBER
170902 0100 B

EFFECTIVE DATE:
JANUARY 18, 1984

Federal Emergency Management Agency

BOS 000354



APPROXIMATE SCALE

2000 0 2000 FEET

KEY TO MAP

Zone Designations*

ZONE C
ZONE A
ZONE C

Base Flood Elevation Line With Elevation In Feet**	513
Base Flood Elevation in Feet Where Uniform Within Zone**	(EL 987)
Elevation Reference Mark	RM7x
Zone D Boundary	
River Mile	•M1.5

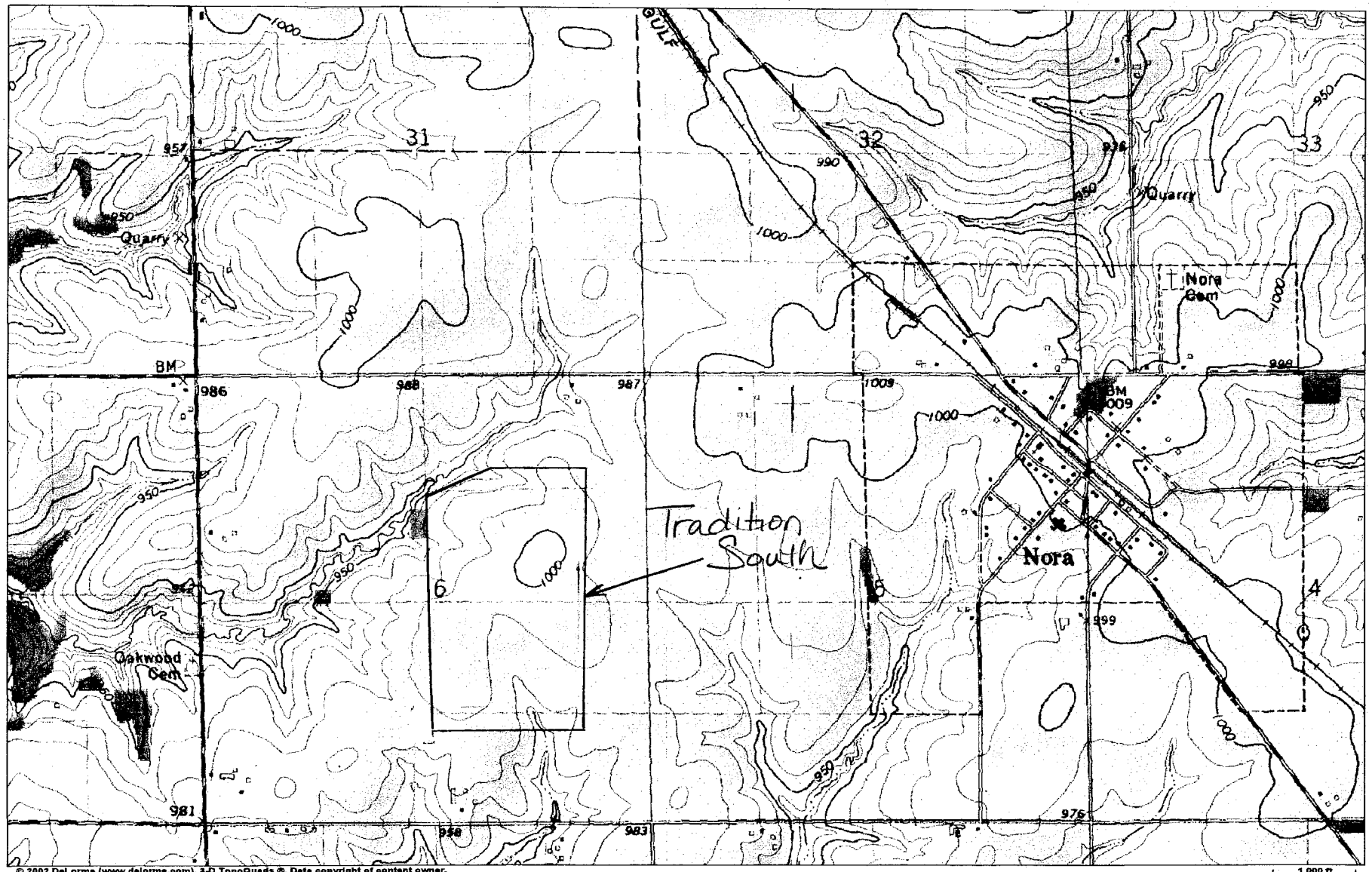
**Referenced to the National Geodetic Vertical Datum of 1929

*EXPLANATION OF ZONE DESIGNATIONS

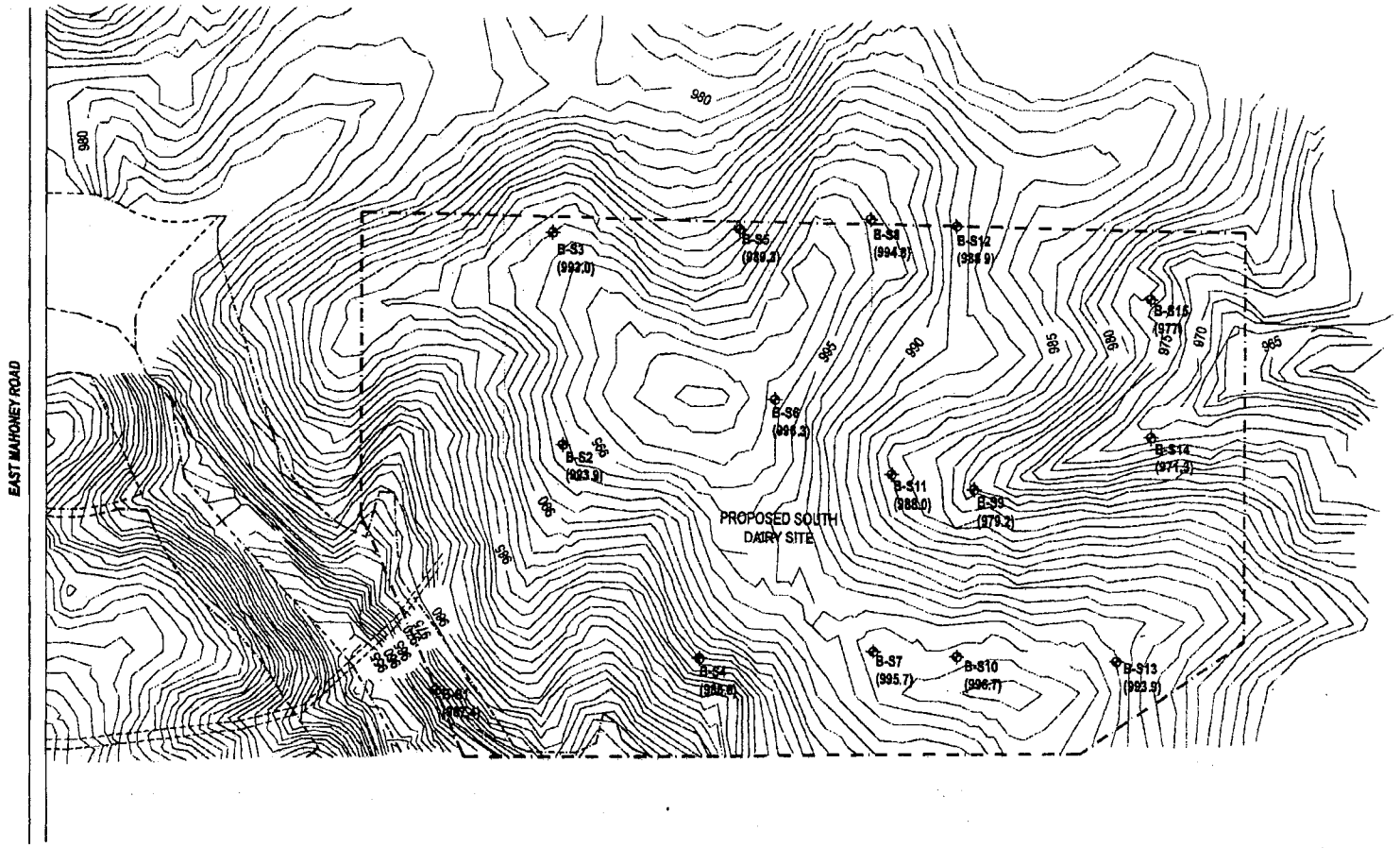
ZONE	EXPLANATION
A	Areas of 100-year flood; base flood elevations and flood hazard factors not determined.
AO	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; average depths of inundation are shown, but no flood hazard factors are determined.
AH	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; base flood elevations are shown, but no flood hazard factors are determined.
A1-A30	Areas of 100-year flood; base flood elevations and flood hazard factors determined.
A99	Areas of 100-year flood to be protected by flood protection system under construction; base flood elevations and flood hazard factors not determined.
B	Areas between limits of the 100-year flood and 500-year flood; or certain areas subject to 100-year flooding with average depths less than one (1) foot or where the contributing drainage area is less than one square mile; or areas protected by levees from the base flood. (Medium shading)
C	Areas of minimal flooding. (No shading)
D	Areas of undetermined, but possible, flood hazards.
V	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors not determined.
V1-V30	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors determined.

NOTES TO USER

BOS 000355



Scale: 1 : 12,800 Map Rotation: 0° Magnetic Declination: 0.7°W



N

NOT TO SCALE

LEGEND

- SUBJECT SITE
- APPROXIMATE SOIL BORING LOCATION
- (X) APPROXIMATE SURFACE ELEVATION (FEET)

THIS DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

Project Mngr: WKB	Project No.: 07075126	Terracon	BORING LOCATION SKETCH
Drawn By: TLY	Scale: AS SHOWN		PROPOSED TRADITIONAL FAMILY DAIRIES SOUTH SIDE EAST MAHONEY ROAD WARREN, ILLINOIS
Checked By: WKB/MRF	File No.: GEOPR9934		
Approved By: WKB	Date: DECEMBER 2007		FIG. No. 2

BS 000356

BORING NO. S1

CLIENT: TRADITIONAL FAMILY DAIRIES

ENGINEER: MAURER-STUTZ, INC.

SITE: EAST MAHONEY ROAD, WARREN, ILLINOIS

PROJECT: PROPOSED SOUTH DAIRY FACILITY

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES * NUMBER	SAMPLES TYPE	SAMPLES RECOVERY, in.	SAMPLES SPT - N ** BLOWS / ft.	TESTS WATER CONTENT, %	TESTS DRY UNIT WT pcf	TESTS UNCONFINED STRENGTH, psf
	Approx. Surface Elev.: 967.4 ft									
	Approx 6" Root Zone				PA					
	FAT CLAY Brown Stiff		CH	1	SS	8	10	22		
	3 964.4				PA					
	HIGHLY WEATHERED LIMESTONE*** Brown			2	SS	10	25/6" 50/5"	10		
		5			PA					
	6.5 960.9			3	SS PA	0	50/1"			
	BOTTOM OF BORING									

Auger refusal at about 6½ feet.

***Classification of rock materials has been estimated from the driller's observations of disturbed samples. Core samples and petrographic analysis may reveal other rock types.

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

*Pocket Penetrometer
**CME 140 lb. SPT automatic hammer

WATER LEVEL OBSERVATIONS, ft				
WL	▽ None	WS	▽ None	AB
WL	▽		▽	
WL				

Terracon

BORING STARTED	12-6-07		
BORING COMPLETED	12-6-07		
RIG	74	FOREMAN	JT
APPROVED	WKB	JOB #	07075126

BOREHOLE 99 SOUTH BORING LOGS.GPJ TERRACON.GDT 1/14/08

BOS 000358

BORING NO. S2

CLIENT: TRADITIONAL FAMILY DAIRIES

ENGINEER: MAURER-STUTZ, INC.

SITE: EAST MAHONEY ROAD, WARREN, ILLINOIS

PROJECT: PROPOSED SOUTH DAIRY FACILITY

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY, in.	SAMPLES SPT - N ** BLOWS / ft.	TESTS WATER CONTENT, %	TESTS DRY UNIT WT pcf	TESTS UNCONFINED STRENGTH, psf
	Approx. Surface Elev.: 993.9 ft									
	Approx. 12" Topsoil				PA					
	LEAN TO FAT CLAY (LOESS) Brown Gray Stiff		CL CH	1	SS	6	8	30		
					PA					
	Brown and gray (mottled) below about 2½ feet		CL CH	2	SS	10	9	31		*3500
	5.5 988.4	5			PA					
	CLAYEY SILT (LOESS) Brown and Gray (Mottled) Medium Stiff		ML CL	3	ST	18		22	102	1650
	Very stiff below about 8½ feet		ML CL	4	SS	14	14	22		*5000
	10 983.9	10								
	BOTTOM OF BORING									

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

*Pocket Penetrometer
**CME 140 lb. SPT automatic hammer

WATER LEVEL OBSERVATIONS, ft				
WL	▽ None	WS	▽ None	AB
WL	▽		▽	
WL				

Terracon

BORING STARTED	12-6-07		
BORING COMPLETED	12-6-07		
RIG	74	FOREMAN	JT
APPROVED	WKB	JOB #	07075126

BOREHOLE 99 SOUTH BORING LOGS.GPJ TERRACON.GDT 1/14/08

BORING NO. S3

CLIENT: TRADITIONAL FAMILY DAIRIES
ENGINEER: MAURER-STUTZ, INC.
SITE: EAST MAHONEY ROAD, WARREN, ILLINOIS
PROJECT: PROPOSED SOUTH DAIRY FACILITY

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY, in.	SAMPLES SPT - N ** BLOWS / ft.	TESTS WATER CONTENT, %	TESTS DRY UNIT WT pcf	TESTS UNCONFINED STRENGTH, psf
	Approx. Surface Elev.: 993 ft									
	Approx 12" Topsoil				PA					
	FAT CLAY (LOESS) Brown Gray, Stiff		CH	1	SS	10	9	29		*3000
	Brown and gray (mottled) below about 2½ feet				PA					
			CH	2	SS	10	8	30		
	5.5 / 987.5	5			PA					
	CLAYEY SILT (LOESS) Brown and Gray (Mottled) Medium Stiff		ML CL	3	ST	20		23	96	1360
					PA					
	Stiff at about 8½ feet		ML CL	4	SS	11		25		*2500
	10 / 983	10								
	BOTTOM OF BORING									

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

*Pocket Penetrometer
**CME 140 lb. SPT automatic hammer

WATER LEVEL OBSERVATIONS, ft				
WL	▽ None	WS	▼ None	AB
WL	▽		▼	
WL				

Terracon

BORING STARTED	12-6-07		
BORING COMPLETED	12-6-07		
RIG	74	FOREMAN	JT
APPROVED	WKB	JOB #	07075126

BOREHOLE 98 SOUTH BORING LOGS.GPJ TERRACON.GDT 1/14/08

BORING NO. S4

CLIENT: TRADITIONAL FAMILY DAIRIES
ENGINEER: MAURER-STUTZ, INC.
SITE: EAST MAHONEY ROAD, WARREN, ILLINOIS
PROJECT: PROPOSED SOUTH DAIRY FACILITY

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY, in.	SAMPLES SPT - N ** BLOWS / ft.	TESTS WATER CONTENT, %	TESTS DRY UNIT WT pcf	TESTS UNCONFINED STRENGTH, psf
	Approx. Surface Elev.: 986.6 ft									
	Approx. 12" Topsoil				PA					
	FAT CLAY (LOESS) Brown Gray Stiff		CH	1	SS	6	7	29		
	Brown and gray (mottled) below aobut 3 feet				PA					
			CH	2	SS	9	6	28		
		5			PA					
	6 980.6									
	CLAYEY SILT (LOESS) Brown and Gray (Mottled) Stiff		ML CL	3	ST	20		22	103	*3500 3300
					PA					
			ML CL	4	SS	16	9	23		
	10 976.6	10								
	BOTTOM OF BORING									

The stratification lines represent the approximate boundary lines between soil and rock types: In-situ, the transition may be gradual.

*Pocket Penetrometer
**CME 140 lb. SPT automatic hammer

WATER LEVEL OBSERVATIONS, ft				
WL	▽ None	WS	▽ None	AB
WL	▽		▽	
WL				

Terracon

BORING STARTED	12-6-07		
BORING COMPLETED	12-6-07		
RIG	74	FOREMAN	JT
APPROVED	WKB	JOB #	07075126

BOREHOLE 99 SOUTH BORING LOGS.GPJ TERRACON.GDT 1/14/08

BORING NO. S5

CLIENT: TRADITIONAL FAMILY DAIRIES
ENGINEER: MAURER-STUTZ, INC.
SITE: EAST MAHONEY ROAD, WARREN, ILLINOIS
PROJECT: PROPOSED SOUTH DAIRY FACILITY

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY, in.	SAMPLES SPT - N ** BLOWS / ft.	TESTS WATER CONTENT, %	TESTS DRY UNIT WT pcf	TESTS UNCONFINED STRENGTH, psf
	Approx. Surface Elev.: 989.3 ft									
	Approx. 12" Topsoil				PA					
	LEAN TO FAT CLAY (LOESS) Brown Gray Stiff		CL CH	1	SS	8	7	32		
	Brown and gray (mottled) and medium stiff below about 3 feet				PA					
			CL CH	2	SS	9	5	28		*2000
		5			PA					
	6 ▽ 983.3									
	LEAN CLAY (LOESS) Brown and Gray (Mottled) Medium Stiff		CL	3	ST	22		25	93	1200
					PA					
	Stiff at about 8½ feet		CL	4	SS	16	8	28		
	10 979.3	10								
	BOTTOM OF BORING									

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

*Pocket Penetrometer
**CME 140 lb. SPT automatic hammer

WATER LEVEL OBSERVATIONS, ft			
WL	▽ 6	WS	▽
WL	▽		▽
WL			

Terracon

BORING STARTED	12-6-07		
BORING COMPLETED	12-6-07		
RIG	74	FOREMAN	JT
APPROVED	WKB	JOB #	07075126

BOREHOLE 99 SOUTH BORING LOGS.GPJ TERRACON.GDT 1/14/08

BOS 000362

BORING NO. S6

CLIENT: TRADITIONAL FAMILY DAIRIES

ENGINEER: MAURER-STUTZ, INC.

SITE: EAST MAHONEY ROAD
WARREN, ILLINOIS

PROJECT: PROPOSED SOUTH DAIRY FACILITY

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY, in.	SAMPLES SPT - N ** BLOWS / ft.	TESTS WATER CONTENT, %	TESTS DRY UNIT WT pcf	TESTS UNCONFINED STRENGTH, psf
	Approx. Surface Elev.: 996.3 ft									
	Approx 12" Topsoil				PA					
	LEAN TO FAT CLAY (LOESS) Brown Gray Stiff		CL CH	1	SS	10	9	30		
	Brown and gray (mottled) below about 3 feet				PA					
			CL CH	2	SS	6	7	29		
		5			PA					
	6 990.3									
	CLAYEY SILT (LOESS) Brown and Gray (Mottled) Stiff		ML CL	3	ST	18		22	100	*3000 2200
					PA					
			ML CL	4	SS	12	12	24		
	10 986.3	10								
	BOTTOM OF BORING									

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

*Pocket Penetrometer
**CME 140 lb. SPT automatic hammer

WATER LEVEL OBSERVATIONS, ft				
WL	▽ None	WS	▽ None	AB
WL	▽		▽	
WL				

Terracon

BORING STARTED	12-6-07		
BORING COMPLETED	12-6-07		
RIG	74	FOREMAN	JT
APPROVED	WKB	JOB #	07075126

BOREHOLE 98 SOUTH BORING LOGS.GPJ TERRACON.GDT 1/14/08

BOS 000363

BORING NO. S7

CLIENT: TRADITIONAL FAMILY DAIRIES
ENGINEER: MAURER-STUTZ, INC.
SITE: EAST MAHONEY ROAD, WARREN, ILLINOIS
PROJECT: PROPOSED SOUTH DAIRY FACILITY

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY, in.	SAMPLES SPT - N ** BLOWS / ft.	TESTS WATER CONTENT, %	TESTS DRY UNIT WT pcf	TESTS UNCONFINED STRENGTH, psf
	Approx. Surface Elev.: 995.7 ft									
	Approx. 12" Topsoil				HS					
	FAT CLAY (LOESS) Brown Gray Stiff		CH	1	SS	8	7	28		
	3 — 992.7				HS					
	LEAN CLAY (LOESS) Brown and Gray (Mottled) Stiff		CL	2	SS	13	6	27		*2500
		5			HS					
	Medium stiff below about 6½ feet ▼		CL	3	ST	24		24	100	1960
	8.5 — 987.2				HS					
	CLAYEY SILT (LOESS) Brown and Gray (Mottled) Stiff		ML CL	4	SS	18	9	28		*4000
		10			HS					
	11.5 — 984.2		CL	5	SS	18	11	23		*4000
	LEAN CLAY Brown and Gray (Mottled) Stiff				HS					
	14 — 981.7		CH	6	SS	18	11	30		
	FAT CLAY Gray Stiff	15			HS					
	16.5 — 979.2		CH	7	SS	18	23	18		*9000+
	FAT CLAY (RESIDUAL SOIL) Brown and Gray Very Stiff to Hard				HS					
	20 — 975.7		CH	8	SS	18	22	14		*9000+
	BOTTOM OF BORING	20								

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

*Pocket Penetrometer
**CME 140 lb. SPT automatic hammer

WATER LEVEL OBSERVATIONS, ft			
WL	▼ None	WS	▼ 8
WL	▼		▼
WL	8' 12/6/07		

Terracon

BORING STARTED	12-5-07		
BORING COMPLETED	12-5-07		
RIG	74	FOREMAN	JT
APPROVED	WKB	JOB #	07075126

BOREHOLE 98 SOUTH BORING LOGS.GPJ TERRACON.GDT 1/14/08

BOS 000364

BORING NO. S8

CLIENT: TRADITIONAL FAMILY DAIRIES
ENGINEER: MAURER-STUTZ, INC.
SITE: EAST MAHONEY ROAD, WARREN, ILLINOIS
PROJECT: PROPOSED SOUTH DAIRY FACILITY

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY, in.	SAMPLES SPT - N ** BLOWS / ft.	TESTS WATER CONTENT, %	TESTS DRY UNIT WT pcf	TESTS UNCONFINED STRENGTH, psf	
	Approx. Surface Elev.: 994.8 ft										
	Approx 12" Topsoil				HS						
	FAT CLAY (LOESS) Brown Gray Stiff		CH	1	SS	11	8	30		*3000	LL=71 PI=47
	Brown and gray (mottled) below about 3 feet				HS						
			CH	2	SS	7	5	31			
		5			HS						
	6.5 988.3										
	CLAYEY SILT (LOESS) ▼ Brown and Gray (Mottled) Stiff		ML CL	3	ST	20		22	101	2800	
					HS						
			ML CL	4	SS	15	8	26			
		10			HS						
	11 983.8										
	LEAN CLAY Brown Stiff		CL	5	SS	18	11	23		*4000	LL=37 PI=17
					HS						
	14 980.8										
	FAT CLAY Brown Very Stiff		CH	6	SS	15	14	34		*5000	
		15			HS						
	16.5 978.3										
	FAT CLAY (RESIDUAL SOIL) Brown and Gray Very Stiff to Hard		CH	7	SS	12	22	22		*9000+	
					HS						
			CH	8	SS	17	26	18		*9000+	
	20 974.8	20									
	BOTTOM OF BORING										

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

*Pocket Penetrometer
**CME 140 lb. SPT automatic hammer

WATER LEVEL OBSERVATIONS, ft				
WL	▼ None	WS	▼ 7	AB
WL	▼		▼	
WL	7' 12/6/07			

Terracon

BORING STARTED	12-5-07		
BORING COMPLETED	12-5-07		
RIG	74	FOREMAN	JT
APPROVED	WKB	JOB #	07075126

BOREHOLE 99 SOUTH BORING LOGS.GPJ TERRACON.GDT 1/14/08

BORING NO. S9

CLIENT: TRADITIONAL FAMILY DAIRIES
ENGINEER: MAURER-STUTZ, INC.
SITE: EAST MAHONEY ROAD, WARREN, ILLINOIS
PROJECT: PROPOSED SOUTH DAIRY FACILITY

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY, in.	SAMPLES SPT - N ** BLOWS / ft.	TESTS WATER CONTENT, %	TESTS DRY UNIT WT pcf	TESTS UNCONFINED STRENGTH, psf	
	Approx. Surface Elev.: 979.2 ft										
	Approx 12" Topsoil				HS						
	FAT CLAY Dark Brown Stiff		CH	1	SS	11	10	41		*2500	
					HS						
			CH	2	SS	11	11	32		*4000	
	Gray below about 5 feet	5			HS						
			CH	3	ST	16		27	95	2820	LL=55 PI=34
					HS						
			CH	4	SS	12	8	34		*3000	
	10 969.2	10									
	BOTTOM OF BORING										

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

*Pocket Penetrometer
**CME 140 lb. SPT automatic hammer

WATER LEVEL OBSERVATIONS, ft				
WL	▽ None	WS	▽ None	AB
WL	▽		▽	
WL				

Terracon

BORING STARTED	12-6-07		
BORING COMPLETED	12-6-07		
RIG	74	FOREMAN	JT
APPROVED	WKB	JOB #	07075126

BOREHOLE 99 SOUTH BORING LOGS.GPJ TERRACON.GDT 1/14/08

BOS. 000366

BORING NO. S10

CLIENT: TRADITIONAL FAMILY DAIRIES
ENGINEER: MAURER-STUTZ, INC.
SITE: EAST MAHONEY ROAD, WARREN, ILLINOIS
PROJECT: PROPOSED SOUTH DAIRY FACILITY

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY, in.	SAMPLES SPT - N** BLOWS / ft.	TESTS WATER CONTENT, %	TESTS DRY UNIT WT pcf	TESTS UNCONFINED STRENGTH, psf
	Approx. Surface Elev.: 996.7 ft									
	Approx. 12" Topsoil				PA					
	FAT CLAY (LOESS) Gray Brown Stiff		CH	1	SS	10	9	33		*4000
	3 — 993.7				PA					
	LEAN TO FAT CLAY (LOESS) Brown and Gray (Mottled) Stiff	5	CL CH	2	SS	10	7	27		*3000
	6 — 990.7				PA					
	LEAN CLAY (LOESS) Brown and Gray (Mottled) Stiff ▼		CL	3	ST	20		26	97	*4000 3120
	8.5 — 988.2				PA					
	CLAYEY SILT (LOESS) Brown and Gray (Mottled) Stiff	10	ML CL	4	SS	15	11	25		*3000
					PA					
	Medium stiff at about 11 feet		ML CL	5	SS	12	6	25		
	14 — 982.7				PA					
	FAT CLAY Brown Stiff	15	CH	6	SS	18	11	32		
	16 — 980.7				PA					
	FAT CLAY Gray Very Stiff		CH	7	SS	16	18	27		*7000
	18 — 978.7				PA					
	FAT CLAY (RESIDUAL SOIL) Brown and Gray Very Stiff to Hard	20	CH	8	SS	15	22	19		*9000+
	20.5 — 976.2									
	BOTTOM OF BORING									

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

*Pocket Penetrometer
**CME 140 lb. SPT automatic hammer

WATER LEVEL OBSERVATIONS, ft				
WL	▽ None	WS	▼ 8	AB
WL	▽		▼	
WL	8' 12/5/07			

Terracon

BORING STARTED	12-4-07		
BORING COMPLETED	12-4-07		
RIG	74	FOREMAN	JT
APPROVED	WKB	JOB #	07075126

BOREHOLE 99 SOUTH BORING LOGS.GPJ TERRACON.GDT 1/14/08

BORING NO. S11

CLIENT: TRADITIONAL FAMILY DAIRIES
ENGINEER: MAURER-STUTZ, INC.
SITE: EAST MAHONEY ROAD, WARREN, ILLINOIS
PROJECT: PROPOSED SOUTH DAIRY FACILITY

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY, in.	SAMPLES SPT - N ** BLOWS / ft.	TESTS WATER CONTENT, %	TESTS DRY UNIT WT pcf	TESTS UNCONFINED STRENGTH, psf	
	Approx. Surface Elev.: 988 ft										
	Approx. 12" Topsoil				HS						
	FAT CLAY (LOESS) Brown to Gray Stiff		CH	1	SS	10	8	28			
	Brown and gray (mottled) below about 3 feet				HS						
			CH	2	SS	14	8				
		5			HS						
	6 982										
	LEAN CLAY (LOESS) Brown and Gray (Mottled) Medium Stiff		CL	3	ST	15		26	96	1720	LL=48 PI=27
					HS						
	Stiff at about 8½ feet		CL	4	SS	16	9	25			
	10 978	10									
	BOTTOM OF BORING										

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

*Pocket Penetrometer
**CME 140 lb. SPT automatic hammer

WATER LEVEL OBSERVATIONS, ft				
WL	▽ None	WS	▽ None	AB
WL	▽		▽	
WL				

Terracon

BORING STARTED	12-6-07		
BORING COMPLETED	12-6-07		
RIG	74	FOREMAN	JT
APPROVED	WKB	JOB #	07075126

BOREHOLE 89 SOUTH BORING LOGS.GPJ TERRACON.GDT 1/14/08

BORING NO. S12

CLIENT: TRADITIONAL FAMILY DAIRIES
ENGINEER: MAURER-STUTZ, INC.
SITE: EAST MAHONEY ROAD, WARREN, ILLINOIS
PROJECT: PROPOSED SOUTH DAIRY FACILITY

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY, in.	SAMPLES SPT - N ** BLOWS / ft.	TESTS WATER CONTENT, %	TESTS DRY UNIT WT pcf	TESTS UNCONFINED STRENGTH, psf
	Approx. Surface Elev.: 988.9 ft									
	Approx 12" Topsoil				HS					
	FAT CLAY (LOESS) Brown and Gray Stiff		CH	1	ST	10	10	28		*3500
	Brown and gray (mottled), medium stiff below about 3 feet				HS					
			CH	2	ST	11	5	29		
	6 / 982.9	5			HS					
	CLAYEY SILT (LOESS) ▼ Brown and Gray Medium Stiff		ML CL	3	ST	15		21	96	1420
					HS					
	Stiff below about 9 feet		ML CL	4	ST	13	8	23		
		10			HS					
			ML CL	5	SS	18	8	28		*3000
	14 / 974.9				HS					
	FAT CLAY Brown Very Stiff		CH	6	SS	16	14	27		
	16.5 / 972.4	15			HS					
	FAT CLAY (RESIDUAL SOIL) Brown and Gray Very Stiff to Hard ▽		CH	7	SS	16	18	25		
					HS					
	20 / 968.9		CH	8	SS	18	26	21		*9000+
	BOTTOM OF BORING	20								

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

*Pocket Penetrometer
**CME 140 lb. SPT automatic hammer

WATER LEVEL OBSERVATIONS, ft				
WL	▽ 18	WS	▽ 6.5	AB
WL	▽		▽	
WL	6½' 12/6/07			

Terracon

BORING STARTED	12-5-07		
BORING COMPLETED	12-5-07		
RIG	74	FOREMAN	JT
APPROVED	WKB	JOB #	07075126

BOREHOLE 99 SOUTH BORING LOGS.GPJ TERRACON.GDT 1/14/08

BOS 000369

BORING NO. S13

CLIENT: TRADITIONAL FAMILY DAIRIES
ENGINEER: MAURER-STUTZ, INC.
SITE: EAST MAHONEY ROAD, WARREN, ILLINOIS
PROJECT: PROPOSED SOUTH DAIRY FACILITY

DEPTH, ft.	DESCRIPTION	USCS SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY, in.	SAMPLES SPT - N ** BLOWS / ft.	TESTS WATER CONTENT, %	TESTS DRY UNIT WT pcf	TESTS UNCONFINED STRENGTH, psf	
	Approx. Surface Elev.: 993.9 ft									
	Approx. 12" Topsoil			HS						
	FAT CLAY (LOESS) Brown to Gray Stiff	CH	1	ST	7		27	87	*3500	LL=68 PI=41
	Medium stiff below about 3 feet			HS						
5		CH	2	ST	12		27	89	*2000	LL=64 PI=39
6	987.9			HS						
	SILTY CLAY (LOESS) Brown and Gray (Mottled) Stiff ▼	CL ML	3	ST	14		29	96	*3000	
				HS						
10		CL ML	4	SS	16	11	23		*4000	
				HS						
		CL ML	5	ST	10		22	101	*4000	
14	979.9			HS						
	FAT CLAY Brown Stiff	CH	6	ST	15		25	95	*3500	
15				HS						
16.5	977.4									
	FAT CLAY (RESIDUAL SOIL) Brown and Gray Hard	CH	7	ST	6		29		*9000+	
				HS						
20		CH	8	SS	12	27	16		*9000+	
				HS						
23	970.9									
24	**HIGHLY WEATHERED LIMESTONE*** ** Brown 969.9		9	SS	1	50/2"				

Continued Next Page

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

*Pocket Penetrometer
**CME 140 lb. SPT automatic hammer

WATER LEVEL OBSERVATIONS, ft				
WL	▽ None	WS	▽ 8	AB
WL	▽		▽	
WL	8' 12/5/07			

Terracon

BORING STARTED	12-4-07		
BORING COMPLETED	12-4-07		
RIG	74	FOREMAN	JT
APPROVED	WKB	JOB #	07075126

BOREHOLE 99 SOUTH BORING LOGS.GPJ TERRACON.GDT 1/14/08

BORING NO. S13

CLIENT	ENGINEER
TRADITIONAL FAMILY DAIRIES	MAURER-STUTZ, INC.
SITE EAST MAHONEY ROAD WARREN, ILLINOIS	**PROJECT** PROPOSED SOUTH DAIRY FACILITY

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: RECOVERY, in.	SAMPLES: SPT - N ** BLOWS / ft.	TESTS: WATER CONTENT, %	TESTS: DRY UNIT WT pcf	TESTS: UNCONFINED STRENGTH, psf
	BOTTOM OF BORING Auger refusal at about 24 feet ***Classification of rock materials has been estimated from disturbed samples Core samples and petrographic analysis may reveal other rock types									

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

*Pocket Penetrometer
**CME 140 lb. SPT automatic hammer

WATER LEVEL OBSERVATIONS, ft				
WL	▽ None	WS	▽ 8	AB
WL	▽		▽	
WL	8' 12/5/07			

Terracon

BORING STARTED	12-4-07		
BORING COMPLETED	12-4-07		
RIG	74	FOREMAN	JT
APPROVED	WKB	JOB #	07075126

BOREHOLE 99 SOUTH BORING LOGS.GPJ TERRACON.GDT 1/14/08

BORING NO. S14

CLIENT: TRADITIONAL FAMILY DAIRIES

ENGINEER: MAURER-STUTZ, INC.

SITE: EAST MAHONEY ROAD, WARREN, ILLINOIS

PROJECT: PROPOSED SOUTH DAIRY FACILITY

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY, in.	SAMPLES SPT - N ** BLOWS / ft.	TESTS WATER CONTENT, %	TESTS DRY UNIT WT pcf	TESTS UNCONFINED STRENGTH, psf	
	Approx. Surface Elev.: 971.3 ft										
	Approx 12" Topsoil				HS						
	FAT CLAY Dark Brown to Brown Stiff		CH	1	ST	11		27	87	*3000	
					HS						
		5	CH	2	ST			33		*3000	
	6.5 964.8				HS						
	FAT CLAY (RESIDUAL SOIL) Brown and Gray Stiff		CH	3	ST			28	94	*3000	LL=73 PI=53
	8.5 962.8 9 **HIGHLY WEATHERED LIMESTONE*** ** 962.3 Brown				HS						
				4	SS		50/1"				
	BOTTOM OF BORING Auger refusal at about 9 feet ***Classification of rock materials has been estimated from the driller's observations of disturbed samples. Core samples and petrographic analysis may reveal other rock types										

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

*Pocket Penetrometer
**CME 140 lb. SPT automatic hammer

WATER LEVEL OBSERVATIONS, ft				
WL	▽ 8	WS	▽ 5.5	AB
WL	▽		▽	
WL	5½' 12/5/07			

Terracon

BORING STARTED	12-4-07		
BORING COMPLETED	12-4-07		
RIG	74	FOREMAN	JT
APPROVED	WKB	JOB #	07075126

BOREHOLE 99 SOUTH BORING LOGS.GPJ TERRACON.GDT 1/14/08

BOS 000372

BORING NO. S15

CLIENT: TRADITIONAL FAMILY DAIRIES
ENGINEER: MAURER-STUTZ, INC.
SITE: EAST MAHONEY ROAD, WARREN, ILLINOIS
PROJECT: PROPOSED SOUTH DAIRY FACILITY

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY, in.	SAMPLES SPT - N ** BLOWS / ft.	TESTS WATER CONTENT, %	TESTS DRY UNIT WT pcf	TESTS UNCONFINED STRENGTH, psf	
	Approx. Surface Elev.: 977 ft										
	Approx 12" Topsoil				HS						
	FAT CLAY (LOESS) Brown to Gray Stiff		CH	1	SS	10	9	29			
	Brown and gray (mottled) and medium stiff below about 3 feet				HS						
			CH	2	SS	13	5	30			
	6 / 971	5			HS						
	LEAN CLAY (LOESS) Brown and Gray (Mottled) Stiff		CL	3	ST			23	101	*2500	LL=32 PI=10
					HS						
			CL	4	SS	14	7	25			
	11 / 966	10			HS						
	LEAN CLAY Gray Stiff		CL	5	SS	18	9	27		*3000	
	14 / 963				HS						
	FAT CLAY Brown Very Stiff		CH	6	SS	15	16	27			
	16.5 / 960.5	15			HS						
	FAT CLAY (RESIDUAL SOIL) Brown and Gray Very Stiff to Hard		CH	7	SS	7	16	18			
					HS						
	20 / 957		CH	8	SS	14	35	18		*9000+	
	BOTTOM OF BORING	20									

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

*Pocket Penetrometer
**CME 140 lb. SPT automatic hammer

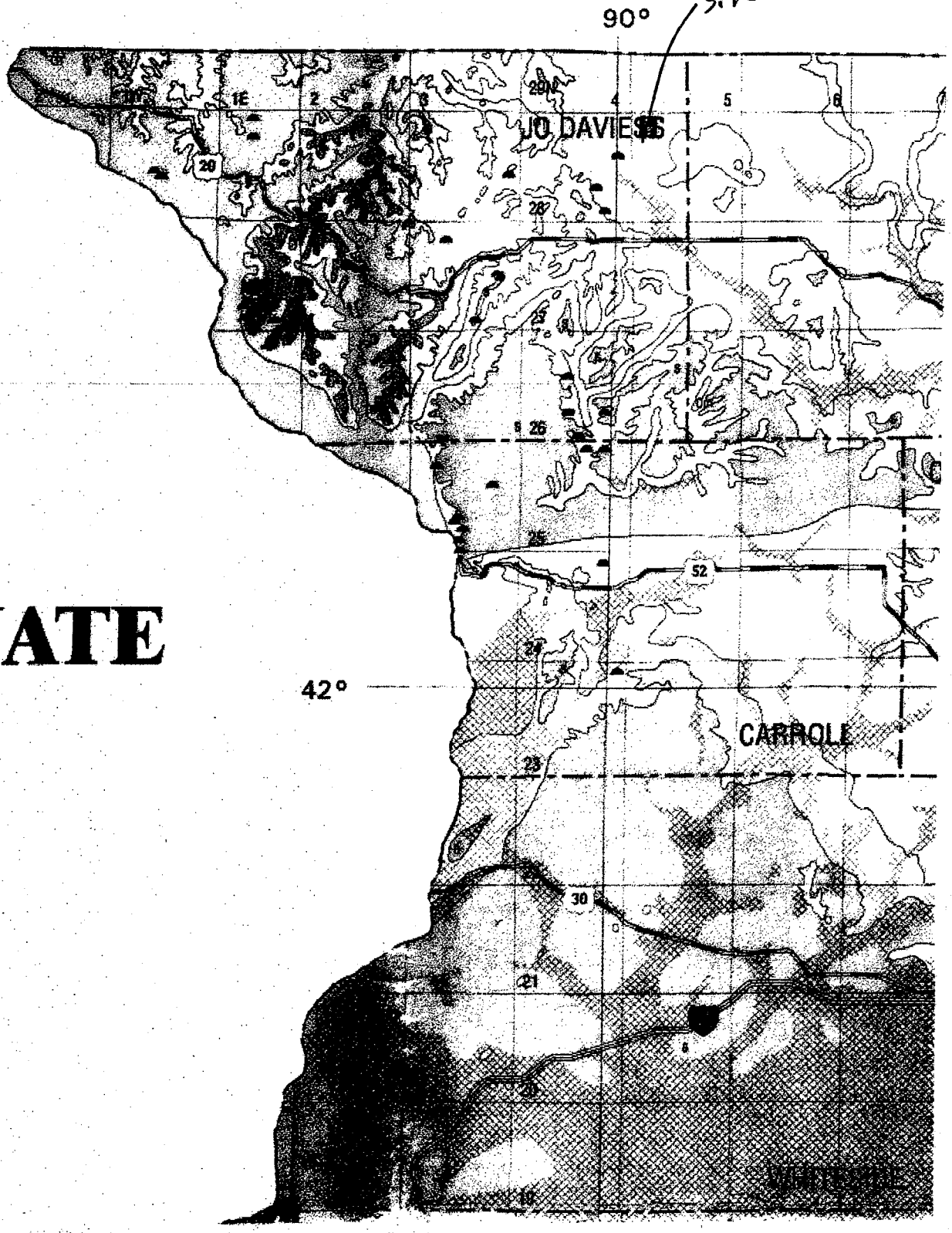
WATER LEVEL OBSERVATIONS, ft				
WL	▽ None	WS	▽ None	AB
WL	▽		▽	
WL				

Terracon

BORING STARTED	12-5-07		
BORING COMPLETED	12-5-07		
RIG	74	FOREMAN	JT
APPROVED	WKB	JOB #	07075126

BOREHOLE 99 SOUTH BORING LOGS.GPJ TERRACON.GDT 1/14/08

Tradition South Site



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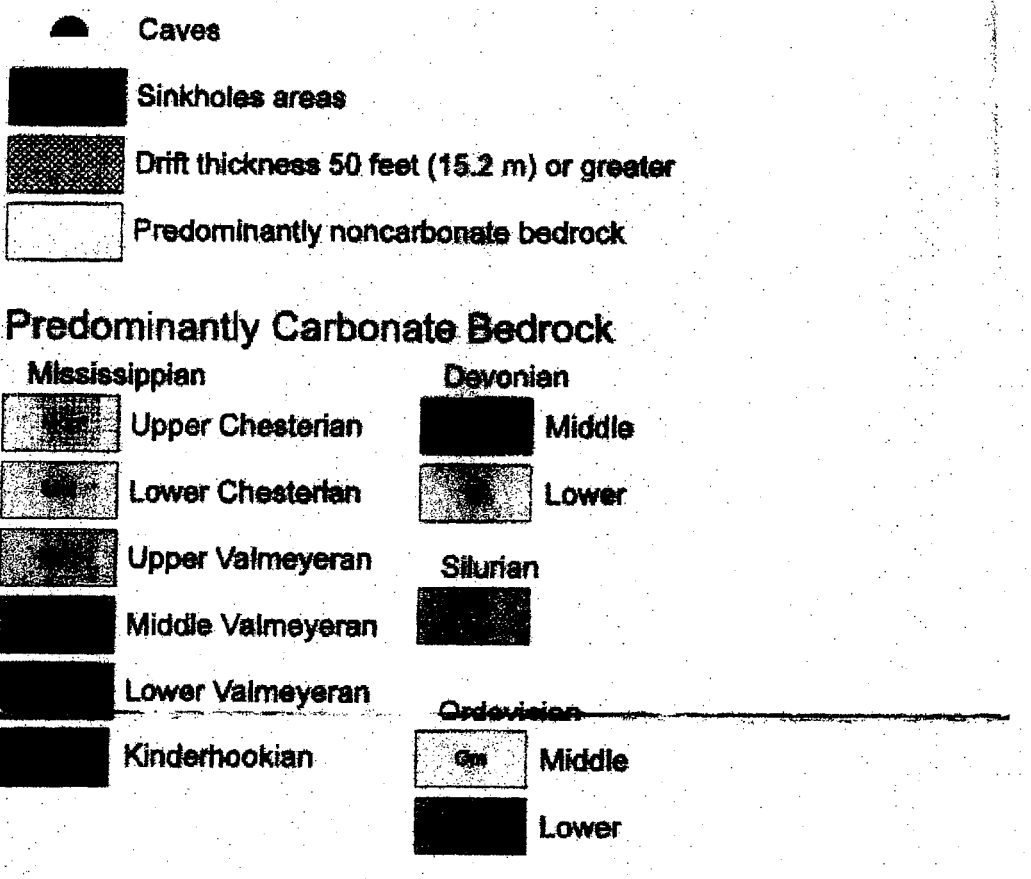

Caves
Sinkholes areas
Drift thickness 50 feet (15.2 m) or greater
Predominantly noncarbonate bedrock
Predominantly Carbonate Bedrock
Mississippian
Upper Chesterian
Lower Chesterian
Upper Valmeyeran
Middle Valmeyeran
Lower Valmeyeran
Kinderhookian
Devonian
Middle
Lower
Silurian
Ordovician
Middle
Lower

EVALUATION OF BEDROCK CORING REPORT FOR
Tradition South Dairy Facility
Exemption (b)(6), Tradition Family Dairies
Location: T.28N R.5E SECTION 6, 4th PM

An additional soil boring/rock coring investigation was performed pursuant to 35 IAC 506.302(c) and Illinois Department of Agriculture request. On February 25 and 26, 2008, the subsurface exploration was conducted by *Terracon Consultants, Inc.* at the direction of Terry Feldmann, P.E. of Maurer Stutz, Inc. In addition to surveying the location and elevation of the borings, Jason Olmstead, EI and Bret Naugle, Professional Geologist of Maurer Stutz, Inc. were on site during the boring/coring exploration in order to observe the boring/coring and sampling. The purpose of this additional coring was to verify whether Karstified Carbonate Bedrock is present or absent in rock cores taken below the planned livestock waste handling facility area or within 20 feet of the livestock waste handling facility boundaries pursuant to the procedures in 35 IAC 506.302.

SOIL/ROCK INVESTIGATION

Three additional borings labeled S16, S17 and S18 were performed. Bedrock coring extended to an elevation of 945' which is more than 20 feet (25'+) below the planned bottom of the livestock waste handling facilities. Soils were continuously sampled and visually classified according to the Unified Soil Classification System (ASTM D2487 & D2488). In addition to recording blow counts and water table depths, various soil samples were collected with both split spoon samplers and Shelby tubes, logged and taken back to a Terracon laboratory to perform additional testing as shown on the attached boring logs. Continuous rock cores were retrieved, examined, boxed and brought back to the Maurer Stutz Inc. Peoria office. See grading plan drawing sheet C3 for the location and elevation of the borings.

The rock cores were examined as they were retrieved and placed in the core boxes. No joints were observed in the core samples. Bedding planes and small fractures were noted but did not show evidence of dissolution. The rock appears to be dolomitic limestone but evidence of a pronounced conduit or secondary conduit due to dissolution of the rock was not found in the core samples.

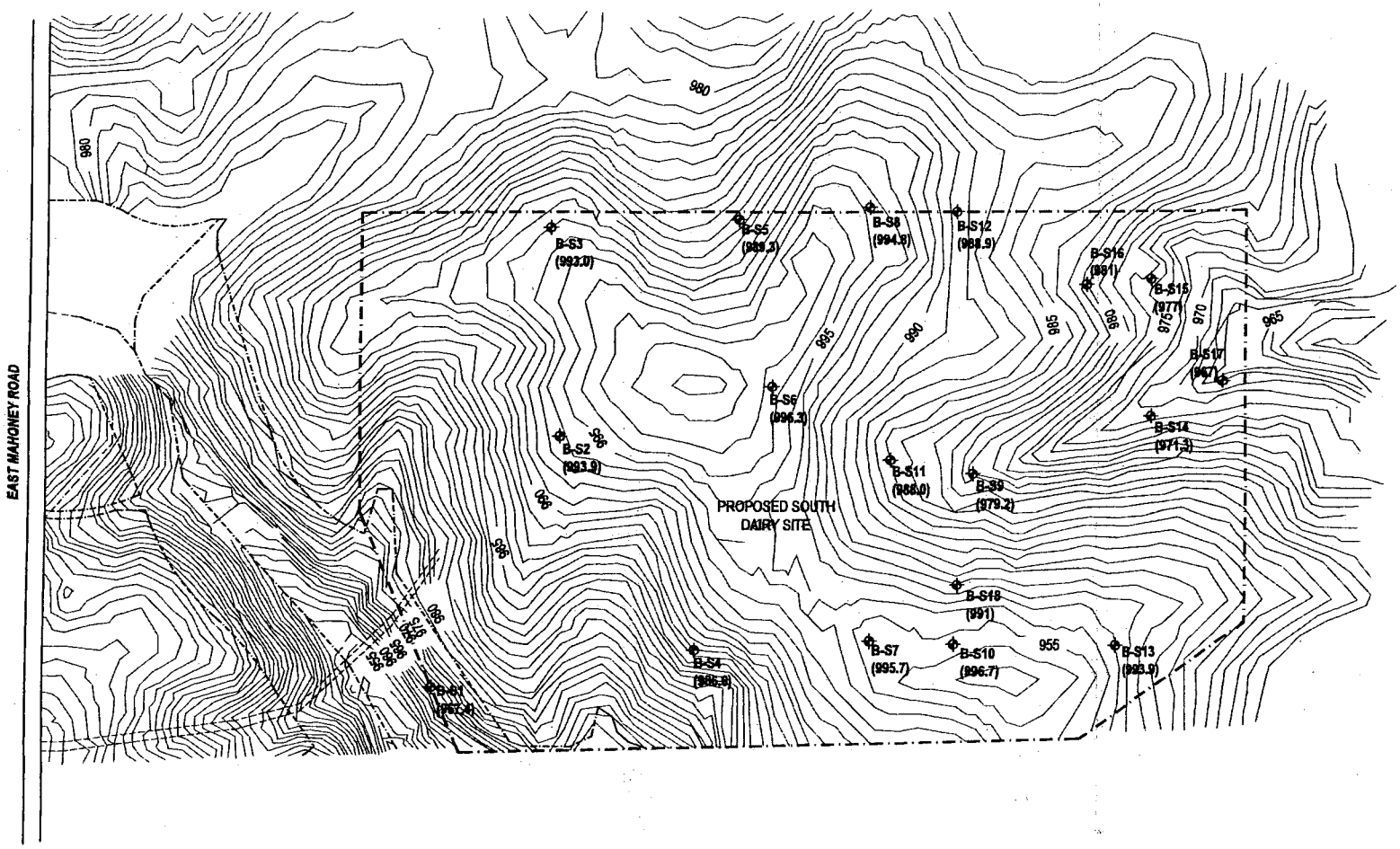
CERTIFICATION STATEMENT

I, the undersigned, do hereby certify that I examined the rock cores and to the best of my professional knowledge and judgment evidence of Karstified Carbonate Bedrock as defined in 35 Illinois Administrative Code 506.103 is <u>not</u> present in the cores retrieved from the exploration described in this report.

Bret Naugle, PG Bret E. Naugle 3-19-08
Registration #196-000347, Expires: 3/31/09

Terry Feldmann, PE Terry Feldmann 3-19-08
Registration #0062-052169, Expires: 11/30/09
Maurer-Stutz, Inc
7615 N. Harker Drive Peoria, IL 616151

BOS 000384



N

NOT TO SCALE

LEGEND

- SUBJECT SITE
- APPROXIMATE SOIL BORING LOCATION
- (X) APPROXIMATE SURFACE ELEVATION (FEET)

THIS DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

Project Mngr:	WKB
Drawn By:	TLY
Checked By:	WKB/MRF
Approved By:	WKB
Project No.	07075126
Scale:	AS SHOWN
File No.	GEO07075126-1
Date:	MARCH 2008

Terracon
Consulting Engineers and Scientists
870 40th Avenue, Bettendorf, Iowa 52722
(563) 355-0702 (563) 355-0789

BORING LOCATION SKETCH
SUPPLEMENTAL BORINGS
PROPOSED TRADITION FAMILY DAIRIES SOUTH SIDE
EAST MAHONEY ROAD
WARREN, ILLINOIS

FIG. No. 1

BORING NO. S16

CLIENT: TRADITION FAMILY DAIRIES
ENGINEER: MAURER-STUTZ, INC.
SITE: WARREN, ILLINOIS
PROJECT: PROPOSED SOUTH DAIRY FACILITY

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY, in.	SAMPLES SPT - N ** BLOWS / ft.	TESTS WATER CONTENT, %	TESTS DRY UNIT WT pcf	TESTS UNCONFINED STRENGTH, psf
	Approx. Surface Elev.: 981 ft									
	Approx. 12" Topsoil				HS					
	LEAN TO FAT CLAY (LOESS) Brown Medium Stiff		CL CH	1	SS	8	5	30		*1500
		5	CL CH	2	SS	5	4	27		
	6 975									
	LEAN CLAY (LOESS) Brown and Gray Stiff to Very Stiff ▽		CL	3	SS	11	7	30		*2000
			CL	4	SS	17	9	26		*4000
		10	CL	5	SS	14	14	27		
	12 969									
	FAT CLAY Brown Very Stiff		CH	6	SS	13	24	30		*6000
		15	CH	7	SS	7	15	29		
	16 965									
	CLAYEY SAND (RESIDUAL SOIL) Brown Medium Dense to Dense		SC	8	SS	3	17	33		
			SC	9	SS	9	17/6" 50/2"	14		
	20 961	20		R1	DB NQ					
	WEATHERED LIMESTONE* ** Brown to Gray	25								
		30		R2	DB NQ					

Continued Next Page

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

*Pocket Penetrometer
**CME 140 lb. SPT automatic hammer

WATER LEVEL OBSERVATIONS, ft			
WL	▽ 7	WS	▽
WL	▽		▽
WL			

Terracon

BORING STARTED	2-26-08		
BORING COMPLETED	2-26-08		
RIG	68	FOREMAN	PR
APPROVED	WKB	JOB #	07075126

BORING NO. S16

CLIENT: TRADITION FAMILY DAIRIES

ENGINEER: MAURER-STUTZ, INC.

SITE: WARREN, ILLINOIS

PROJECT: PROPOSED SOUTH DAIRY FACILITY

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: RECOVERY, in.	SAMPLES: SPT - N ** BLOWS / ft.	TESTS: WATER CONTENT, %	TESTS: DRY UNIT WT pcf	TESTS: UNCONFINED STRENGTH, psf
	WEATHERED LIMESTONE*** Brown to Gray	35								
	36 945 BOTTOM OF BORING									

***Classification of rock materials was estimated by the drill crew. Petrographic analysis may reveal other rock types.

GDT 3/10/08

e stratification lines represent the approximate boundary lines
veen soil and rock types: in-situ, the transition may be gradual.

*Pocket Penetrometer
**CME 140 lb. SPT automatic hammer

ER LEVEL OBSERVATIONS, ft

7 WS ▼

▼

Terracon

BORING STARTED	2-26-08		
BORING COMPLETED	2-26-08		
RIG	68	FOREMAN	PR
APPROVED	WKB	JOB #	07075126

BS 000387

BORING NO. S17

CLIENT: TRADITION FAMILY DAIRIES

ENGINEER: MAURER-STUTZ, INC.

SITE: WARREN, ILLINOIS

PROJECT: PROPOSED SOUTH DAIRY FACILITY

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY, in.	SAMPLES SPT - N ** BLOWS / ft.	TESTS WATER CONTENT, %	TESTS DRY UNIT WT pcf	TESTS UNCONFINED STRENGTH, psf
	Approx. Surface Elev.: 967 ft									
	Approx. 12" Topsoil				HS					
	LEAN TO FAT CLAY (LOESS) Dark Brown Stiff to Medium Stiff		CL CH	1	ST	24				*3000
			CL CH	2	ST	18				*2000
	5 962	5								
	LEAN CLAY (LOESS) Brown and Gray Very Stiff		CL	3	ST	24				*3500
			CL	4	ST	24				*500
	Soft at about 7 feet 9 958									
	CLAYEY SAND (RESIDUAL SOIL) Brown	10	SC	5	ST	22				
			SC	6	ST	18				
	12.5 954.5									
	WEATHERED LIMESTONE**** Brown to Gray	15		R1	DB NQ					
	22 945	20								
	BOTTOM OF BORING									

***Soil descriptions are based on the driller's field classification of disturbed samples.

****Classification of rock materials was estimated by the drill crew. Petrographic analysis may reveal other rock types.

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

*Pocket Penetrometer
**CME 140 lb. SPT automatic hammer

WATER LEVEL OBSERVATIONS, ft			
WL	▽ 7.5	WS	▽ 6
WL	▽		▽
WL	6' 2/26/08		

Terracon

BORING STARTED	2-25-08		
BORING COMPLETED	2-25-0		
RIG	68	FOREMAN	
APPROVED	WKB	JOB #	0707

BOREHOLE 99 RE...NG LOGS.GPJ TERRACON.GDT 3/10/08

BORING NO. S18

CLIENT: TRADITION FAMILY DAIRIES

ENGINEER: MAURER-STUTZ, INC.

SITE: WARREN, ILLINOIS

PROJECT: PROPOSED SOUTH DAIRY FACILITY

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY, in.	SAMPLES SPT - N ** BLOWS / ft.	TESTS WATER CONTENT, %	TESTS DRY UNIT WT pcf	TESTS UNCONFINED STRENGTH, psf
	Approx. Surface Elev.: 991 ft									
	Approx. 14" Topsoil				HS					
	LEAN TO FAT CLAY Brown Stiff		CL CH	1	SS	9	8	28		*2500
	Medium stiff at about 4 feet	5	CL	2	SS	18	6	30		
	6 985									
	SILTY CLAY ▽ Brown and Gray Stiff		CL ML	3	SS	13	10	24		*2500
	Very stiff at about 8 feet		CL ML	4	SS	15	14	27		
	12 979	10	CL ML	5	SS	9	11	25		
	LEAN CLAY Brown, Stiff		CL	6	SS	15	11	24		
	14 977									
	FAT CLAY (RESIDUAL SOIL) Brown Very Stiff	15	CH	7	SS	13	16	28		*4500
			CH	8	SS	9	17	18		*6000
	Hard at about 18 feet		CH	9	SS	5	37	21		*9000+
	20 971	20								
	WEATHERED LIMESTONE*** Brown to Gray			R1	DB NQ					
		25								
		30		R2	DB NQ					

Continued Next Page

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

*Pocket Penetrometer
**CME 140 lb. SPT automatic hammer

WATER LEVEL OBSERVATIONS, ft			
WL	▽ 7	WS	▽
WL	▽		▽
WL			

Terracon

BORING STARTED	2-26-08		
BORING COMPLETED	2-26-08		
RIG	68	FOREMAN	PR
APPROVED	WKB	JOB #	07075126

BORING NO. S18

CLIENT: TRADITION FAMILY DAIRIES

ENGINEER: MAURER-STUTZ, INC.

SITE: WARREN, ILLINOIS

PROJECT: PROPOSED SOUTH DAIRY FACILITY

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY, in.	SAMPLES SPT - N ** BLOWS / ft.	TESTS WATER CONTENT, %	TESTS DRY UNIT WT pcf	TESTS UNCONFINED STRENGTH, psf
	WEATHERED LIMESTONE* Brown to Gray	35								
		40		R3	DB NQ					
	46 945	45								
	BOTTOM OF BORING									

***Classification of rock materials was estimated by the drill crew. Petrographic analysis may reveal other rock types.

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

*Pocket Penetrometer
**CME 140 lb. SPT automatic hammer

WATER LEVEL OBSERVATIONS, ft			
WL	▽ 7	WS	▽
WL	▽		▽
WL			

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BORING STARTED	2-26-08		
BORING COMPLETED	2-26-08		
RIG	68	FOREMAN	PR
APPROVED	WKB	JOB #	07075126

GENERAL NOTES

Bos 000390

Sedimentary Rock Classification

DESCRIPTIVE ROCK CLASSIFICATION:

Sedimentary rocks are composed of cemented clay, silt and sand sized particles. The most common minerals are clay, quartz and calcite. Rock composed primarily of calcite is called limestone; rock of sand size grains is called sandstone, and rock of clay and silt size grains is called mudstone or claystone, siltstone, or shale. Modifiers such as shaly, sandy, dolomitic, calcareous, carbonaceous, etc. are used to describe various constituents. Examples: sandy shale; calcareous sandstone.

LIMESTONE	Light to dark colored, crystalline to fine-grained texture, composed of $CaCo_3$, reacts readily with HCl.
DOLOMITE	Light to dark colored, crystalline to fine-grained texture, composed of $CaMg(CO_3)_2$, harder than limestone, reacts with HCl when powdered.
CHERT	Light to dark colored, very fine-grained texture, composed of micro-crystalline quartz ($Si0_2$), brittle, breaks into angular fragments, will scratch glass.
SHALE	Very fine-grained texture, composed of consolidated silt or clay, bedded in thin layers. The unlaminated equivalent is frequently referred to as siltstone, claystone or mudstone.
SANDSTONE	Usually light colored, coarse to fine texture, composed of cemented sand size grains of quartz, feldspar, etc. Cement usually is silica but may be such minerals as calcite, iron-oxide, or some other carbonate.
CONGLOMERATE	Rounded rock fragments of variable mineralogy varying in size from near sand to boulder size but usually pebble to cobble size (½ inch to 6 inches). Cemented together with various cementing agents. Breccia is similar but composed of angular, fractured rock particles cemented together.

DEGREE OF WEATHERING:

SLIGHT	Slight decomposition of parent material on joints. May be color change.
MODERATE	Some decomposition and color change throughout.
HIGH	Rock highly decomposed, may be extremely broken.

Classification of rock materials has been estimated from disturbed samples. Core samples and petrographic analysis may reveal other rock types.

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GENERAL NOTES

BOS 000391

DRILLING & SAMPLING SYMBOLS:

SS:	Split Spoon - 1-3/8" I.D., 2" O.D., unless otherwise noted	HS:	Hollow Stem Auger
ST:	Thin-Walled Tube - 2" O.D., unless otherwise noted	PA:	Power Auger
RS:	Ring Sampler - 2.42" I.D., 3" O.D., unless otherwise noted	HA:	Hand Auger
DB:	Diamond Bit Coring - 4", N, B	RB:	Rock Bit
BS:	Bulk Sample or Auger Sample	WB:	Wash Boring or Mud Rotary

The number of blows required to advance a standard 2-inch O.D. split-spoon sampler (SS) the last 12 inches of the total 18-inch penetration with a 140-pound hammer falling 30 inches is considered the "Standard Penetration" or "N-value".

WATER LEVEL MEASUREMENT SYMBOLS:

WL:	Water Level	WS:	While Sampling
WCI:	Wet Cave in	WD:	While Drilling
DCI:	Dry Cave in	BCR:	Before Casing Removal
AB:	After Boring	ACR:	After Casing Removal

Water levels indicated on the boring logs are the levels measured in the borings at the times indicated. Groundwater levels at other times and other locations across the site could vary. In pervious soils, the indicated levels may reflect the location of groundwater. In low permeability soils, the accurate determination of groundwater levels may not be possible with only short-term observations.

DESCRIPTIVE SOIL CLASSIFICATION: Soil classification is based on the Unified Classification System. Coarse Grained Soils have more than 50% of their dry weight retained on a #200 sieve; their principal descriptors are: boulders, cobbles, gravel or sand. Fine Grained Soils have less than 50% of their dry weight retained on a #200 sieve; they are principally described as clays if they are plastic, and silts if they are slightly plastic or non-plastic. Major constituents may be added as modifiers and minor constituents may be added according to the relative proportions based on grain size. In addition to gradation, coarse-grained soils are defined on the basis of their in-place relative density and fine-grained soils on the basis of their consistency.

CONSISTENCY OF FINE-GRAINED SOILS

Unconfined Compressive Strength, Qu, psf	Standard Penetration or N-value (SS) Blows/Ft.	Consistency
< 500	<2	Very Soft
500 – 1,000	2-3	Soft
1,001 – 2,000	4-6	Medium Stiff
2,001 – 4,000	7-12	Stiff
4,001 – 8,000	13-26	Very Stiff
8,000+	26+	Hard

RELATIVE DENSITY OF COARSE-GRAINED SOILS

Standard Penetration or N-value (SS) Blows/Ft.	Relative Density
0 – 3	Very Loose
4 – 9	Loose
10 – 29	Medium Dense
30 – 49	Dense
50+	Very Dense

RELATIVE PROPORTIONS OF SAND AND GRAVEL

Descriptive Term(s) of other constituents	Percent of Dry Weight
Trace	< 15
With	15 – 29
Modifier	> 30

GRAIN SIZE TERMINOLOGY

Major Component of Sample	Particle Size
Boulders	Over 12 in. (300mm)
Cobbles	12 in. to 3 in. (300mm to 75 mm)
Gravel	3 in. to #4 sieve (75mm to 4.75 mm)
Sand	#4 to #200 sieve (4.75mm to 0.075mm)
Silt or Clay	Passing #200 Sieve (0.075mm)

RELATIVE PROPORTIONS OF FINES

Descriptive Term(s) of other constituents	Percent of Dry Weight
Trace	< 5
With	5 – 12
Modifiers	> 12

PLASTICITY DESCRIPTION

Term	Plasticity Index
Non-plastic	0
Low	1-10
Medium	11-30
High	30+

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UNIFIED SOIL CLASSIFICATION SYSTEM

BOS 000392

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests[A]				Soil Classification	
				Group Symbol	Group Name[B]
Coarse-Grained Soils More than 50% retained on No. 200 sieve	Gravels More than 50% of coarse fraction retained on No. 4 sieve	Clean Gravels Less than 5% fines[C]	$Cu \geq 4$ and $1 \leq Cc \leq 3$[E]	GW	Well-graded gravel[F]
			$Cu < 4$ and/or $1 > Cc > 3$[E]	GP	Poorly graded gravel[F]
		Gravels with Fines More than 12% fines[C]	Fines classify as ML or MH	GM	Silty gravel[F, G, H]
			Fines classify as CL or CH	GC	Clayey gravel[F, G, H]
	Sands 50% or more of coarse fraction passes No. 4 sieve	Clean Sands Less than 5% fines[E]	$Cu \geq 6$ and $1 \leq Cc \leq 3$[E]	SW	Well-graded sand[I]
			$Cu < 6$ and/or $1 > Cc > 3$[E]	SP	Poorly graded sand[I]
		Sands with Fines More than 12% fines[D]	Fines classify as ML or MH	SM	Silty sand[G, H, I]
			Fines classify as CL or CH	SC	Clayey sand[G, H, I]
Fine-Grained Soils 50% or more passes the No. 200 sieve	Silts and Clays Liquid limit less than 50	inorganic	PI > 7 and plots on or above "A" line[J]	CL	Lean clay[K, L, M]
			PI < 4 or plots below "A" line[J]	ML	Silt[K, L, M]
		organic	Liquid limit — oven dried / Liquid limit — not dried < 0.75	OL	Organic clay[K, L, M, N] / Organic silt[K, L, M, O]
	Silts and Clays Liquid limit 50 or more	inorganic	PI plots on or above "A" line	CH	Fat clay[K, L, M]
			PI plots below "A" line	MH	Elastic silt[K, L, M]
		organic	Liquid limit — oven dried / Liquid limit — not dried < 0.75	OH	Organic clay[K, L, M, P] / Organic silt[K, L, M, Q]
Highly organic soils	Primarily organic matter, dark in color, and organic odor			PT	Peat

[A] Based on the material passing the 3-in. (75-mm) sieve.

[B] If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.

[C] Gravels with 5 to 12% fines require dual symbols:
GW-GM well-graded gravel with silt
GW-GC well-graded gravel with clay
GP-GM poorly graded gravel with silt
GP-GC poorly graded gravel with clay

[D] Sands with 5 to 12% fines require dual symbols:
SW-SM well-graded sand with silt
SW-SC well-graded sand with clay
SP-SM poorly graded sand with silt
SP-SC poorly graded sand with clay

[E] $Cu = D_{60}/D_{10}$ $\quad Cc = \dfrac{(D_{30})^2}{D_{10} \times D_{60}}$

[F] If soil contains ≥ 15% sand, add "with sand" to group name.

[G] If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.

[H] If fines are organic, add "with organic fines" to group name.

[I] If soil contains ≥ 15% gravel, add "with gravel" to group name.

[J] If Atterberg limits plot in shaded area, soil is a CL-ML, silty clay.

[K] If soil contains 15 to 29% plus No. 200, add "with sand" or "with gravel", whichever is predominant.

[L] If soil contains ≥ 30% plus. No. 200 predominantly sand, add "sandy" to group name.

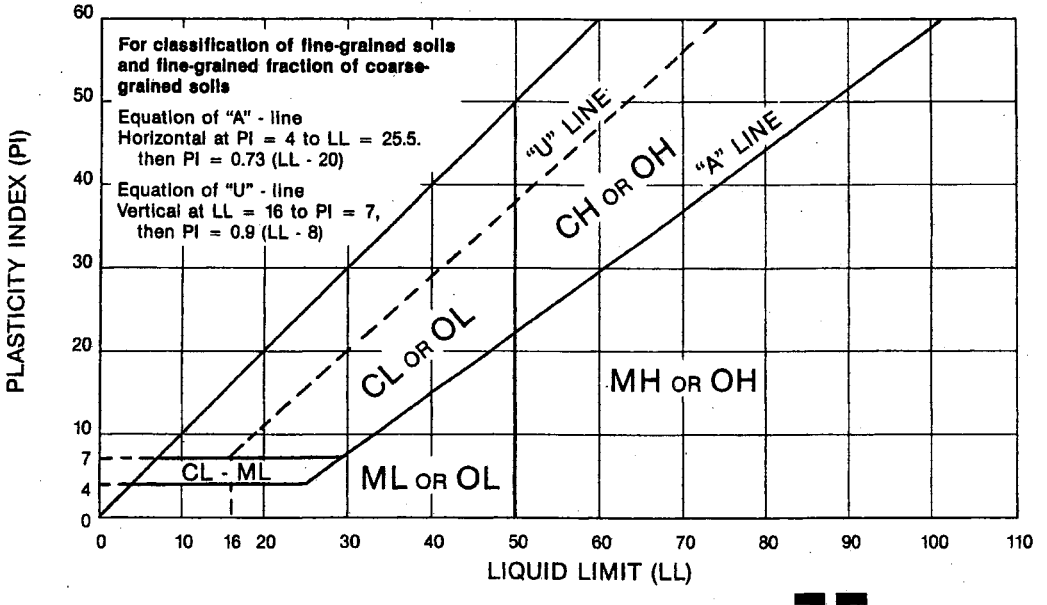
[M] If soil contains ≥ 30% plus No. 200, predominantly gravel, add "gravelly" to group name.

[N] PI ≥ 4 and plots on or above "A" line.

[O] PI < 4 or plots below "A" line.

[P] PI plots on or above "A" line.

[Q] PI plots below "A" line.



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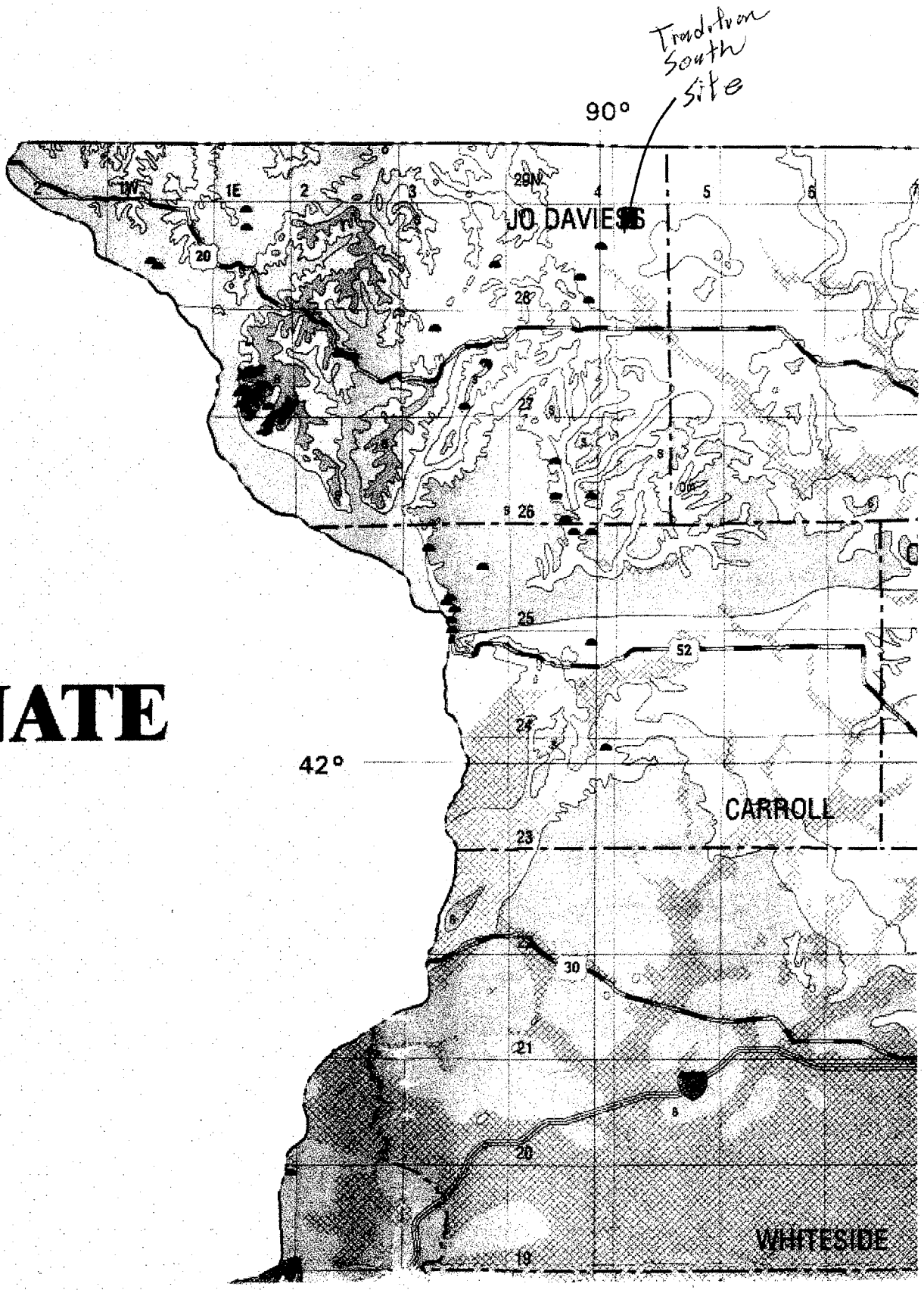
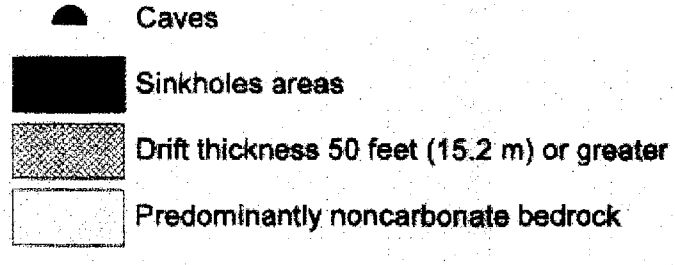
Form 111—6-85



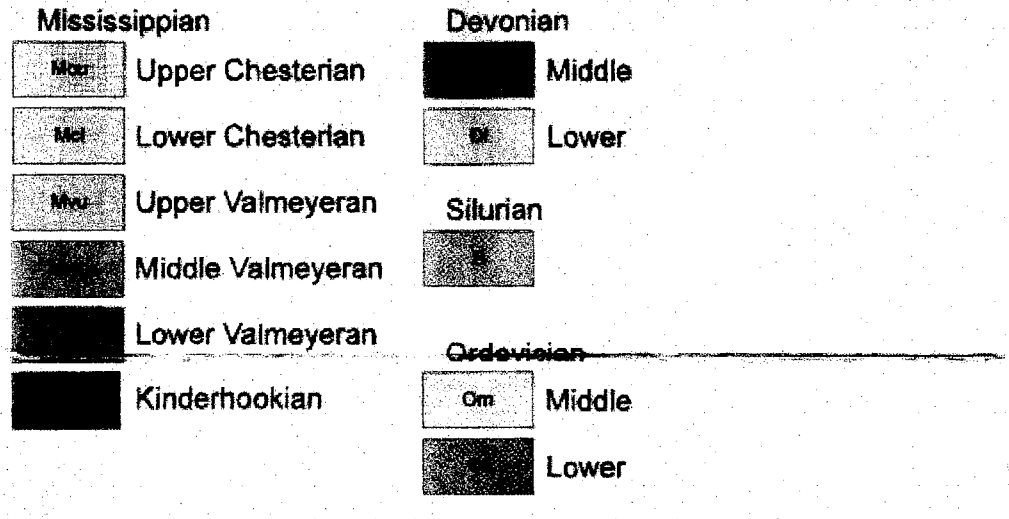
kBONATE

IS

no



Predominantly Carbonate Bedrock



ADDITIONAL EVALUATION OF BEDROCK CORING REPORT FOR Tradition South Dairy Facility Exemption (b)(6), Tradition Family Dairies Location: T.28N R.5E SECTION 6, 4th PM

In response to the Illinois Department of Agriculture's April 2, 2008 letter, an additional rock coring investigation was performed at the above-referenced site on April 9 and 10, 2008. The subsurface investigation consisted of completion of two borings angled at 45 degrees and continuous rock coring sample collection and logging to vertical depths of at least 20 feet below the planned bottom of the proposed livestock waste handling facility and provided horizontal projections of at least 20 feet of bedrock in each boring. In addition, each boring was directed horizontally 90 degrees from each other. The first boring completed extended in a generally southern direction parallel to the small ditch/stream which flows through the site and exits the southern boundary of the property. The second boring was initiated in the same general location as the first boring but was angled in a generally east direction. The subsurface investigation was conducted under the direction of Terry Feldmann, P.E. of Maurer-Stutz, Inc. with field oversight, logging, and rock core collection performed by Bret Naugle, P.G. of Maurer-Stutz, Inc. The drilling activities were completed by Terracon Consultants, Inc. The purpose of this additional coring investigation was to verify whether Karstified Carbonate Bedrock is present or absent in rock cores taken below the planned livestock waste handling facility area or within 20 feet of the livestock waste handling facility boundaries pursuant to the procedures in 35 IAC 506.302.

BEDROCK INVESTIGATION

The two additional borings labeled B-17A and B-17B were performed in the immediate vicinity of the S17 boring completed during the last subsurface investigation (and at the same surface elevation of 967'). Bedrock coring in each boring extended to an elevation of approximately 936' which is more than 20 feet (34'+) below the planned bottom of the livestock waste handling facilities. Per the Department's instruction, the unconsolidated sediments were not logged or classified. Continuous rock cores were retrieved, examined, boxed, labeled and brought back to the Maurer-Stutz, Inc. Peoria office. See grading plan drawing sheet C3 for the location and elevation of the borings.

The rock cores were examined as they were retrieved and placed in the core boxes. No joints in the core samples were identified. It should be noted that if significant joints were present in the bedrock underlying the site, water migration downward through the joints would intersect bedding planes within the bedrock and likely would cause erosion or flushing away of clay seams present in many of the bedding planes. No evidence of erosion or removal of clay seams along the bedding planes was identified in the sample cores collected. In addition, the drillers reported no loss of core bit cooling water to the formation during any of the drilling activities which would be expected if any significant voids were present. Bedding planes and small fractures were noted but pronounced dissolution along those surfaces was not observed. The rock consists of dolomitic limestone (dolomite). Evidence of a pronounced conduit or secondary porosity due to dissolution of the rock was not found in the core samples. In addition, with the exception of the initial core samples (i.e., top of bedrock) retrieved from each boring, all remaining core samples collected were substantially full

recoveries. No significant voids were observed in the core samples. For additional information regarding the core sample descriptions, please refer to the attached boring logs.

RECONNAISSANCE OF SITE AND SURROUNDING AREA

In addition to performing the on-site subsurface investigation, Maurer-Stutz, Inc. visually investigated the site and surrounding area for topographical evidence of karst features.

Original efforts in the Fall of 2007 to characterize the site and search for topographical karst features included Maurer-Stutz, Inc.'s thorough topographical survey of the Tradition South site utilizing GPS and total station surveying equipment. The topographic surveying was conducted using a grid pattern with elevation measurements collected approximately every 50 feet in the north-south direction and approximately every 100 feet in the east-west direction. Evidence of sinkholes or other surficial karst features were not found during the surveying activities nor upon examination of the survey data. Please refer to the attached topographical survey map for an illustration of the survey data points and site topography. In addition, land surfaces within 400 feet of the planned facility where topography surveying was not conducted were visually surveyed by Maurer Stutz, Inc. staff including the ditch/stream located in the southern portion of the proposed facility as well as an area approximately 100 feet west of the west property line. (west of P14)

Further, if Karstified Carbonate Bedrock was present, one would expect evidence within the stream(s) located on and extending from the proposed facility location. A visual survey of the stream found no evidence of large springs or disrupted drainage. For example, if there were karstified joints in the bedrock that is located at or near the elevation of the stream beds, one would expect that these joints would cause the water in the stream to enter the joints and cause evidence of a losing stream where stream flow would decrease. Evidence of a losing stream was not found at the facility location or in the surrounding area. Continuous water flow was observed in the streams at the proposed facility location and downstream where the streams crossed under Illinois Route 78.

Additionally, on April 9, 2008, the small streambed located in the southern central portion of the proposed facility was again investigated for the presence losing streams, sinkholes, seeps, springs, etc. and none were identified throughout the portion of the streambed extending to East Canyon Road (i.e., the southern edge of Section 6). Due to recent heavy rains, runoff to the streambed was plentiful with numerous field drainage tiles observed flowing into this stream. No sign of water loss to the underlying bedrock was visible. It should be noted that while the upper portion of the stream has silt/clay sediments on the bottom and the southern portion of the on-site stream has a predominantly gravel bottom, the central approximately 75 feet of the stream has a hard bottom on apparent dolomite bedrock. No evidence of significant voids, fractures, or joints allowing downward migration of the stream water were identified.

Bret Naugle, P.G. performed additional limited site area reconnaissance by driving Canyon Road east from the site to Williams Road then northward to East Mahoney Road, westward to Route 78, south to Canyon Road and back to the site. The intent was to search the perimeter of the site area for evidence of sinkholes, losing streams, or other topographic karst features. These features should have been readily apparent given the volume of surface water runoff at the time of the observations. None were found.

CERTIFICATION STATEMENT

I, the undersigned, do hereby certify that I examined the rock cores and to the best of my professional knowledge and judgment evidence of Karstified Carbonate Bedrock as defined in 35 Illinois Administrative Code 506.103 is not present in the cores retrieved from the investigation described in this report.

Bret Naugle, PG Bret E. Naugle 4-17-08
Registration #196-000347, Expires: 3/31/09

Terry Feldmann, PE Terry Feldmann 4-17-08
Registration #0062-052169, Expires: 11/30/09
Maurer-Stutz, Inc
7615 N. Harker Drive Peoria, IL 616151

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Tradition South
MSI Project No. 238-07026

GEOLOGIC BORING LOG

Site Name: Tradition South Address: Nora, IL					Boring Number B-17A	Date Completed: 4/9/08
Sample Number	Sample Device	Sample Recovery (feet)	Lithology Symbol	Depth (feet) (drilled at 45° angle)	Soil / Rock Description	
					Surface EL=967'	
				1		
				1.5		
				2		
				2.5		
				3		
				3.5		
				4		
				4.5		
				5		
				5.5		
				6		
				6.5		
				7		
N/A	N/A	N/A	N/A	7.5	Unconsolidated Materials from the ground surface to an angled depth of 15.5 feet.	
				8		
				8.5		
				9		
				9.5		
				10		
				10.5		
				11		
				11.5		
				12		
				12.5		
				13		
				13.5		
				14		
				14.5		
				15		

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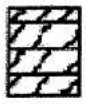
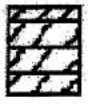
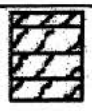
					EL= 956'
1	Diamond Bit Coring at an angle of 45°	3.5'		15.5 16 16.5 17 17.5 18 18.5 19 19.5 20	15.5 - 20.5' core: Recovered approximately 3.5' (Likely due to fractured upper portion or flushing away clay layers from bit cooling H_2O.) Gray & yellowish-brown dolomitized limestone with few thin interbedded clay (shale) layers. No evidence of pronounced dissolution, vugs, joints, etc. Tested with HCL & determined to be dolomite.
					EL= 952.5'
2		Full 5'		20.5 21 21.5 22 22.5 23 23.5 24 24.5 25	20.5' - 25.5' core: Mostly gray with lesser yellowish-brown dolomite (HCL tested) with small crystals of pyrite and possibly galena in lower foot. Full recovery; couple thin clay (shale) layers; all core pieces fit tightly together; no pronounced dissolution or vugs. More yellowish-brown in upper portion and gray through rest.
					EL=949'
3		Full 5'		25.5 26 26.5 27 27.5 28 28.5 29 29.5 30	25.5' - 30.5' core: Mostly gray with lesser yellowish-brown dolomite with approximately 3 thin clay (shale) layers. Full recovery. Few tiny vugs. All core pieces fit tightly together. No pronounced dissolution.
					EL= 9445.4'
4		Full 1.5'		30.5 31 31.5	30.5' - 32.0' core: Mostly gray with lesser yellowish & reddish-brown dolomite (HCL tested) with one thin clay layer & couple very small vugs. No evidence of pronounced dissolution.
					EL= 9434.4'
5		Full 3.5'		32 32.5 33 33.5 34 34.5 35	32.0' - 35.5' core: Mostly gray with lesser yellow-brown dolomite with one thin clay layer. No significant vugs/dissolution/all core pieces fit tightly together. Full recovery.
					EL=942.3'

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Tradition South
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6	Diamond Bit Coring at an angle of 45°	Full 5'		35.5 36 36.5 37 37.5 38 38.5 39 39.5 40	35.5' - 40.5' core: Same as above; One thin clay layer on bedding plane; contains 2 small sandy zones; Few small vugs; No significant dissolution. Full recovery.
					EL=938.7'
7		Full 3.5'		40.5 41 41.5 42 42.5 43 43.5 44	40.5' - 44.0' core: Same mostly gray dolomite; Few small sandy zones; Common very small vugs; No significant dissolution; Core pieces fit tightly together; Full recovery.
					EL= 935.9'

Groundwater Data Depth While Drilling Approximately 10' Depth After Drilling Not Measured	Total Depth 44' Rig CME 550 Engineering Co. Maurer-Stutz, Inc. Geologist B. Naugle, PG Driller/Co. Terracon

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Tradition South
MSI Project No. 238-07026

GEOLOGIC BORING LOG

Site Name: Tradition South Address: Nora, IL					Boring Number B-17B	Date Completed: 4/10/08
Sample Number	Sample Device	Sample Recovery (feet)	Lithology Symbol	Depth (feet) (drilled at 45° angle)	Soil / Rock Description	
					Surface EL = 967'	
				1		
				1.5		
				2		
				2.5		
				3		
				3.5		
				4		
				4.5		
				5		
				5.5		
				6		
N/A	N/A	N/A	N/A	6.5	Unconsolidated Materials from the ground surface to an angled depth of 13 feet.	
				7		
				7.5		
				8		
				8.5		
				9		
				9.5		
				10		
				10.5		
				11		
				11.5		
				12		
				12.5		
					EL= 957.8'	
N/A	N/A	N/A		13	13' - 14.5' weathered bedrock surface/too loose to core so	
				13.5	augered until auger refusal at 14.5' and began coring.	
				14		
					EL= 956.75'	
1	Diamond Bit Coring	2"		14.5	14.5 - 15' core: recovered 2" of gray & yellowish brown dolomite;	
					typical; no significant dissolution, no vugs; mineralized hairline	
					fractures.	
					EL=956.4'	

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Tradition South
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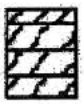
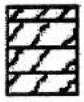
2	Diamond Bit Coring at an angle of 45°	Full 2'		15 15.5 16 16.5	15' - 17' core: Had to stop coring before end of 5' run due to core sampler blockage/plugged up from fractured pieces of rock so removed approximately 2' of material and resumed coring. Mostly yellowish brown dolomite with lesser gray; no vugs/dissolution; upper ~1' good solid dolomite core; lower ~1' fractured pieces of dolomite with lesser clay (shale) interbeds likely causing fracturing. EL= 955'
3		Full 3'		17 17.5 18 18.5 19 19.5	17' - 20' core: Same yellowish brown and gray dolomite with one thin clay seam; no vugs/dissolution; nearly full recovery. EL= 952.9'
4		Full 5'		20 20.5 21 21.5 22 22.5 23 23.5 24 24.5	20' - 25' core: Yellowish brown and gray changing to gray dolomite with several thin clay interbeds and little mineralization at about 24'; full recovery; nearly all core pieces interlock tightly. EL= 949.3'
5		Full 5'		25 25.5 26 26.5 27 27.5 28 28.5 29 29.5	25' - 30' core: Mostly gray with lesser yellowish brown dolomite; few thin clay layers; few small vugs and fossils; full recovery; no significant dissolution/voids; nearly all core pieces interlock. EL= 948.8'
6		Full 5'		30 30.5 31 31.5 32 32.5 33 33.5 34 34.5	30' - 35' core: Mostly gray with lesser yellowish brown dolomite but only trace of clay in bedding plane at about 34'; common very small vugs and few small areas of apparent minor dissolution and fossils; full recovery; nearly all core pieces interlock tightly. EL= 942.3'

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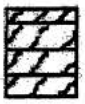
Tradition South
MSI Project No. 238-07026

7	Diamond Bit Coring at an angle of 45°	Full 5'		35 35.5 36 36.5 37 37.5 38 38.5 39 39.5	35' - 40' core: Same as above but ~ 3 sandy zones and one bedding plane with little clay; few fossils/casts; no significant dissolution/vugs; full recovery; nearly all core pieces interlock tightly.
					EL= 938.7'
8		Full 3.5'		40 40.5 41 41.5 42 42.5 43 43.5	40' - 43.5' core: Gray and yellowish brown dolomite with few sandy zones and one thin clay layer (~43'); full recovery; pieces fit tightly together; some dissolution/ common vugs from ~41' - 42' but within core and not along joints, fractures or bedding planes.
					EL= 936.2'

Groundwater Data Depth While Drilling Not Recorded Depth After Drilling Not Measured	Total Depth 43.5' Rig CME 550 Engineering Co. Maurer-Stutz, Inc. Geologist B. Naugle, PG Driller/Co. Terracon

BOS 000600

Illinois Department of Agriculture

NON-LAGOON LIVESTOCK WASTE HANDLING FACILITY
CERTIFICATION OF SITE INVESTIGATION

A. General Location Information:

Jo Daviess	28-N	5-E	4 TH
County Name	Township #	Range #	Prin. Meridian

6	E 1/2	ALL
Section #	1/4 Section	1/4-1/4 Section

B. Facility Information:

Name: TRADITION SOUTH (Digester & Additional components)

Mailing Address: 12521 E. Mahoney Rd.
Warren, IL 61087

Phone Number:

Facility ID #: LF0850180001

C. Owner or Operator Information:

Name: Exemption (b)(6)

Company: TRADITION FAMILY DAIRIES

Mailing Address: 15857 BEAR MOUNTIAN BLVD
BAKERSFIELD, CA 93311

Phone Number: Exemption (b)(6)

D. Site Investigation Results:

The site investigation has resulted in a finding that: *(Please answer YES or NO to each question)*

N Aquifer Material is present within 5 feet of the planned bottom of the livestock waste handling facility. (holding ponds only)

N The proposed facility is located in the floodway of a 100 year floodplain. *(If yes, construction is prohibited)*

N The proposed facility is located in the flood fringe of a 100 year floodplain.

N The proposed facility is located in a karst area.

N The proposed facility is located within 400' of a natural depression in a karst area. *(If yes, construction is prohibited)*

E. Supporting Justification and Verification Documents:

Pursuant to 8 Ill. Adm. Code 900.503(c) or 8 Ill. Adm. Code 900.504(b)(8), supporting justification and

data from a Licensed Professional Engineer, Licensed Professional Geologist or a representative of the Natural Resources Conservation Service of the United States Department of Agriculture designated to perform such functions relative to the site investigation results is required as part of this certification.

F. Certification Statement:

"I hereby certify that the information provided on this form is correct and that the site investigation which produced this information was performed in accordance with all applicable requirements of 8 Ill. Adm. Code 900.503(a) or 8 Ill. Adm. Code 504(b)(7)."

Signature of the ~~Owner or Operator~~ Engineer

SITE INVESTIGATION REPORT FOR
Tradition South Dairy Facility
Exemption (b)(6) Tradition Family Dairies

Location: T.28N R.5E SECTION 6, 4th PM

A Site Investigation was performed pursuant to 35 IAC 506.302. On December 4, 2007 a soils investigation was conducted by *Terracon Consultants, Inc.* at the direction of Terry Feldmann, P.E. The purpose of this soils investigation and overall site investigation was to determine the design requirements for a dairy facility as follows:

1. Determine if aquifer material is present within 5' of the planned bottom of the livestock waste handling facility.
2. Determine if the proposed livestock waste handling facility is located within the floodway or flood fringe of a 100-year flood plain.
3. Determine if the proposed livestock waste handling facility is located within a karst area or within 400 feet of a natural depression in a karst area.
4. Determine the elevation of a seasonal high water table if present.
5. Determine the soil type, classification, and soil properties to be used for foundation design.
6. Identify liner candidate material for further testing.

100-YEAR FLOOD PLAIN

After review of the FEMA 100 year flood plain map and USGS topography map, it is clear that the proposed facility is not located within the flood way or flood fringe of a 100-year flood plain. See copy of attached maps.

INITIAL SOILS INVESTIGATION

Pursuant to 35 IAC 506.302 (b) for facilities not located within an area designated as "Sink Hole Areas" on IDNR-ISGS Illinois Map 8, "*Karst Terrains and Carbonate Rocks of Illinois*" (see attached portion of the map showing the proposed facility location), at least one soil boring with continuous sampling is required to be performed within 20-feet of the livestock waste handling facility boundary and extend a minimum five (5) feet below the planned bottom of the facility to determine the presence of aquifer material or Karstified Carbonate Bedrock. Since the proposed facility is not located within an area designated as "Sink Hole Areas" on Illinois Map 8, and Karstified Carbonate Bedrock was not encountered pursuant to 35 IAC section 506.302(b), the requirements of 35 IAC 506.302(g) which state that the boring would extend a minimum of 20-feet below the planned bottom, were not included in this initial investigation.

The initial soils investigation consisted of fifteen (15) soil borings throughout different locations within and near the proposed facility that extended to various depths. Review of the

boring logs (see attached) indicates that seven (7) extended to a depth of 10'-0" below existing grade, five (5) extended to a depth of 20'-0" below existing grade, and three (3) reached refusal in bedrock at depths of 6.5', 9' and 24' below existing grades. Soils were continuously sampled and visually classified according to the Unified Soil Classification System (ASTM D2487 & D2488). In addition to recording blow counts and water table depths various soil samples were collected with both split spoon and Shelby tubes, logged and taken back to the laboratory to perform additional testing. The results of which are shown on the boring logs. See the attached grading plan drawing for the location of the borings and elevations.

The soil borings indicate that carbonate bedrock is overlain by a layer of very stiff to hard, FAT CLAY (USCS-CH) residual soil of varying thickness, overlain generally by a LEAN CLAY (USCS-CL) loess and/or CLAYEY SILT (USCS-ML/CL) loess, overlain by a FAT CLAY (USCS-CH) loess and about 1 foot of topsoil. The residual soil, being of low permeability, creates a perched water table above it. Water is therefore predominately expected to move horizontally down the slopes rather than vertically through the residual soil. This is likely the reason that subsurface field drainage tiles are located within proposed facility location. The FAT CLAY loess and FAT CLAY residual soils are both expected to provide excellent clay liner construction materials. Static Water Table elevations varied from 5.5' below grade to greater than 20'. However, season High Water Table (SHWT) depths as indicated by mottling ranged from 2.5' to 3' below grade. Due to the SHWT elevations, the holding ponds will need a perimeter drainage tile as part of the design while the barns will be above the SHWT and not require perimeter drainage.

ADDITIONAL SOIL/BEDROCK INVESTIGATION

On February 25 and 26, 2008, three additional borings labeled S16, S17, and S18 were performed. Bedrock coring extended to an elevation of 945', which is more than 20 feet below the planned bottom of the livestock waste handling facilities. Soils were continuously sampled and visually classified according to the United Soil Classification System (ASTM D2487 & D2488). In addition to recording blow counts and water table depths, various soil samples were collected with both split spoon samplers and Shelby tubes, logged, and taken back to a Terracon laboratory to perform additional testing as shown on the attached boring logs. Continuous rock cores were retrieved, examined, boxed, and brought back to the Maurer-Stutz, Inc. Peoria office. See grading plan-drawing sheet C3 for the location and elevation of the borings.

The rock cores were examined as they were retrieved and placed in the core boxes. No joints were observed in the core samples. Bedding planes and small fractures were noted but did not show evidence of dissolution. The rock appears to be dolomitic limestone but evidence of a pronounced conduit or secondary conduit due to dissolution of the rock was not found in the core samples.

On April 9 and 10, 2008 the two additional borings labeled B-17A and B-17B were performed in the immediate vicinity of the S17 boring completed during the last subsurface investigation (and at the same surface elevation of 967'). Bedrock coring in each boring extended to an

elevation of approximately 936' which is more than 20 feet (34'+) below the planned bottom of the livestock waste handling facility ponds. Per the Department's instruction, the unconsolidated sediments were not logged or classified. Continuous rock cores were retrieved, examined, boxed, labeled, and brought back to the Maurer-Stutz, Inc. Peoria office. See grading plan-drawing sheet C3 for the location and elevation of the borings.

The rock cores were examined as they were retrieved and placed in the core boxes. No joints in the core samples were identified. It should be noted that if significant joints were present in the bedrock underlying the site, water migration downward through the joints would intersect bedding planes within the bedrock and likely would cause erosion or flushing away of clay seams present in many of the bedding planes. No evidence of erosion or removal of clay seams along the bedding planes was identified in the sample cores collected. In addition, the drillers reported no loss of core bit cooling water to the formation during any of the drilling activities which would be expected if any significant voids were present. Bedding planes and small fractures were noted but pronounced dissolution along those surfaces was not observed. The rock consists of dolomitic limestone (dolomite). Evidence of a pronounced conduit or secondary porosity due to dissolution of the rock was not found in the core samples. In addition, with the exception of the initial core samples (i.e., top of bedrock) retrieved from each boring, all remaining core samples collected were substantially full recoveries. No significant voids were observed in the core samples. For additional information regarding the core sample descriptions, please refer to the attached boring logs.

RECONNAISSANCE OF SITE AND SURROUNDING AREA

In addition to performing the on-site subsurface investigation, Maurer-Stutz, Inc. visually investigated the site and surrounding area for topographical evidence of karst features.

Original efforts in the Fall of 2007 to characterize the site and search for topographical karst features included Maurer-Stutz, Inc.'s thorough topographical survey of the Tradition South site utilizing GPS and total station surveying equipment. The topographic surveying was conducted using a grid pattern with elevation measurements collected approximately every 50 feet in the north-south direction and approximately every 100 feet in the east-west direction. Evidence of sinkholes or other surficial karst features were not found during the surveying activities or upon examination of the survey data. Please refer to the attached topographical survey map for an illustration of the survey data points and site topography. In addition, land surfaces within 400 feet of the planned facility where topography surveying was not conducted were visually surveyed by Maurer Stutz, Inc. staff including the ditch/stream located in the southern portion of the proposed facility as well as an area approximately 400 feet west of the proposed digester.

Further, if Karstified Carbonate Bedrock was present, one would expect evidence within the stream(s) located on and extending from the proposed facility location. A visual survey of the stream found no evidence of large springs or disrupted drainage. For example, if there were Karstified joints in the bedrock that is located at or near the elevation of the stream beds, one would expect that these joints would cause the water in the stream to enter the joints and cause evidence of a losing stream where stream flow would decrease. Evidence of a losing

stream was not found at the facility location or in the surrounding area. Continuous water flow was observed in the streams at the proposed facility location and downstream where the streams crossed under Illinois Route 78.

Additionally, on April 9, 2008, the small streambed located in the southern central portion of the proposed facility was again investigated for the presence losing streams, sinkholes, seeps, springs, etc. and none were identified throughout the portion of the streambed extending to East Canyon Road (i.e., the southern edge of Section 6). Due to recent heavy rains, runoff to the streambed was plentiful with numerous field drainage tiles observed flowing into this stream. No sign of water loss to the underlying bedrock was visible. It should be noted that while the upper portion of the stream has silt/clay sediments on the bottom and the southern portion of the on-site stream has a predominantly gravel bottom, the central approximately 75 feet of the stream has a hard bottom on apparent dolomite bedrock. No evidence of significant voids, fractures, or joints allowing downward migration of the stream water were identified.

Bret Naugle, P.G. performed additional limited site area reconnaissance by driving Canyon Road east from the site to Williams Road then northward to East Mahoney Road, westward to Route 78, south to Canyon Road and back to the site. The intent was to search the perimeter of the site area for evidence of sinkholes, losing streams, or other topographic karst features. These features should have been readily apparent given the volume of surface water runoff at the time of the observations. None were found.

AQUIFER MATERIAL DETERMINATION

The carbonate bedrock encountered within 5 feet of the planned bottom of the holding ponds is presumed to be aquifer material. However, no aquifer material was encountered within the soil above the bedrock. No aquifer material was encountered within 5' of the planned bottom of the digester or additional tanks and concrete structures proposed. Specifically, soil-boring S7 extended 5.5 feet below the digester, P23, and aquifer material was not encountered.

KARST AREA DETERMINATION

In addition to reviewing water well logs, soil survey maps and USGS topography maps an on-site review and survey of the land surface was conducted within the proposed facility location by Terry Feldmann, PE, Jason Olmstead, EI and Rudy Dixon, EI, SIT under the direction of Terry Feldmann, PE. During the on-site survey and review of the land surface, evidence of Karst features such as sinkholes, large springs, disrupted land drainage or underground drainage systems associated with Karstified Carbonate Bedrock was not found.

An additional soil boring/rock coring investigation was performed pursuant to 35 IAC 506.302(c) on February 25 and 26, 2008, the subsurface exploration was conducted by *Terracon Consultants, Inc.* at the direction of Terry Feldmann, P.E. of Maurer-Stutz, Inc. In addition to surveying the location and elevation of the borings, Jason Olmstead, EI and Bret Naugle, Professional Geologist of Maurer-Stutz, Inc. were on site during the boring/coring exploration in order to observe the boring/coring and sampling. The purpose of this

additional coring was to verify whether Karstified Carbonate Bedrock is present or absent in rock cores taken below the planned livestock waste handling facility area or within 20 feet of the livestock waste handling facility boundaries pursuant to the procedures in 35 IAC 506.302.

An additional rock coring investigation was performed on April 9 and 10, 2008. The subsurface investigation consisted of completion of two borings angled at 45 degrees and continuous rock coring sample collection and logging to vertical depths of at least 20 feet below the planned bottom of the proposed livestock waste handling facility and provided horizontal projections of at least 20 feet of bedrock in each boring. In addition, each boring was directed horizontally 90 degrees from each other. The first boring completed extended in a generally southern direction parallel to the small ditch/stream, which flows through the site and exits the southern boundary of the property. The second boring was initiated in the same general location as the first boring but was angled in a generally east direction. The subsurface investigation was conducted under the direction of Terry Feldmann, P.E. of Maurer-Stutz, Inc. with field oversight, logging, and rock core collection performed by Bret Naugle, P.G. of Maurer-Stutz, Inc. The drilling activities were completed by Terracon Consultants, Inc. The purpose of this additional coring investigation was to verify whether Karstified Carbonate Bedrock is present or absent in rock cores taken below the planned livestock waste handling facility area or within 20 feet of the livestock waste handling facility boundaries pursuant to the procedures in 35 IAC 506.302.

BQS 000607

CERTIFICATION STATEMENT

"I, the undersigned, do hereby certify to the best of my professional knowledge and judgment that the site investigation associated with the site which is the subject of this construction plan was conducted under my direction and meets all the applicable requirements of the Livestock Management Facilities Act. Furthermore, the site investigation has resulted in a finding that:

1. The uppermost aquifer material is presumed to be located within 5 feet of the lowest point of the planned bottom of the holding ponds, but not within 5' of the planned bottom of the barns and other proposed waste handling components.
2. A subsurface perimeter drainage tile is needed around the digester P23 and reception tanks P27 and P25, and holding ponds P14, P16, and P17as the seasonal high water table is above the planned bottom. However, the seasonal high water table is below the planned bottom of the barns and other components.
3. The proposed facility is not located within a Karst Area.
4. The proposed facility is not located within the floodway or flood fringe of a 100-year floodplain.
5. Tank P28 will be designed to resist buoyancy from the seasonal high water table.

Terry Feldmann
Maurer-Stutz, Inc
7615 N. Harker Drive
Peoria, IL 616151
Ph: 309-693-7615
Fax: 309-693-7616

SIGNATURE: Terry Feldmann

DATE : 10-10-08

Registration # 0062-052169
Expires: 11/30/09
Stamp or Seal

Supporting justification and data relative to the findings of the site investigation are attached.
(USGS topography map, Grading Plan, boring logs, Illinois Map 8 and FEMA 100-year Floodplain map).